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ILLUSTRATIONS.

Tomb of Filippo Decio, Campo Santo, Pisa.—Details 928
Sculpture at the Royal Academy.—VI. "The Mower." By Mr. William Hamo Thornycroft, A.R.A. 930
Church of St. John the Divine, Gainsborough.—Mr. Somers Clarke, Jun., and Mr. J. T. Micklethwaite, Architects 932, 933
Newel of the Grand Staircase, Château de Blois 935
House, Lyndhurst, for Mr. Maxwell.—Mr. F. S. Brewer, Architect 937
A High-pressure Water Meter: Elevation and Sections 940, 941
Plan of the Château de Blois 942

CONTENTS.

Technical Education at Home and Abroad 919
The Value of House Property in England, and its Growth in a Decade 921
The Building Materials of America 923
Notes 924
Sculpture at the Royal Academy 925
The Throttle-Valve of the Mersey 926
Details of Tomb of Filippo Decio 926
Sculpture at the Royal Academy. No. 6.—"The Mower." By Mr. Hamo Thornycroft, A.R.A. 926
House, Lyndhurst 926
Church of St. John the Divine, Gainsborough 939
Newel of Grand Staircase, Château de Blois 939
Mr. Du Maurier's Drawings 939
Recent Architectural Progress at Vienna 939
A High-Pressure Water-Meter: H. W. Pendred's Patent 940
The Congress of French Architects 941
A Model Bakery 943
Architecture at University College 943
Hatchett's Hotel 943
Arbitration Case: Clark *v.* Booth 943
Stained Glass 943
Books: Gardiner's "Admission Registers of St. Paul's School" (Bell) 944
Building Patent Record 944
Meetings 944
Miscellanea 945
INTERNATIONAL HEALTH EXHIBITION.—(SUPPLEMENT.)
Electric Lighting 947
Meteorology 948
The Dairies 948
The Preservation of Food 950
Baths, Lavatories, Drainage, Water Fittings, &c. 950
Wood-Working Machinery Exhibits and Appliances 951
Health Exhibition Lectures:—
Candles 952
The History of English Dress 953
Healthy Building and Legislation 953

*Technical Education at Home and Abroad.**

ASSUMING the subject of our heading, we come now to that of technical education proper, as illustrated in the establishment and conduct of special trade and technical schools abroad, and the courses of instruction they supply for those intended for industrial pursuits. We must, perforce, from the great variety of those schools and classes of instruction as reported upon by the Royal Commission, confine our notice to a few leading types. There are a number of evening schools available for artisans in France and other Continental states, designed for the instruction of apprentices and others during and after their term of apprenticeship, and for adult workmen occupied during the day at their ordinary work. In these very useful schools, drawing and modelling, with a view to direct application to special trades, form the staple of instruction, in some cases supplemented by the execution of practical work in the materials of the trade to which the education appertains. Lectures are given occasionally, in addition to the regular school work, on artistic and scientific subjects having relation to various industries, and such lectures are often given under the auspices of the local authorities, or by the various trade societies of masters, or workmen, or both. The Commissioners admit that this system of evening instruction is one of the most striking features of the present condition of educational effort in France. The schools and kindred institutions are many, and corresponding courses of instruction exist in Paris for young women. The Industrial Society of Rheims is a noticeable one, providing evening lectures for artisans. Here there are classes for learning English, and others for free-hand drawing from copies and casts, projection, mechanical, and architectural drawing. The art night schools for artisans exert a great influence on the development of the art industries of France. The École Nationale des Arts Décoratifs appears to be one of the most important of the Paris schools available for evening instruction in drawing. Its foundation in its original form dates as far back as 1765, but it was shortly afterwards taken over by the Government. It underwent many changes, and it received its present name in 1877. It has sixteen professors, under the direction of M. de Lajolais, and 800 pupils receive tuition. The reputation of this school has been so firmly established that it is stated that many of the best artists and designers in France owe to it their early training.

There are a number of provincial drawing-schools,—indeed, nearly every provincial town has one,—similar to those of Paris. Evening instruction for artisans in Switzerland is wide-spread, the continuation schools being numerous, supplementing the teaching of the primary schools. Drawing is specially attended to in these schools, and in those for girls, needle-work. A good type of these schools is afforded by the classes of the local Industrial Society in Zurich (Gewerbe Schulen Verein). They meet on week-day evenings, and also on Sunday mornings. The following subjects among others are taught,—free-hand drawing, four hours per week; linear drawing, three hours; applied drawing for the following trades each three hours per week,—masons, carpenters, cabinet-makers, mechanics, locksmiths, and white-smiths; arithmetic, two hours per week; geometry, two hours; writing, four hours; book-keeping, two hours; German language or spelling, two hours; French, three hours; English, two hours. The conditions of entering are that students must be sixteen years of age, and must show that they possess sufficient previous knowledge to profit by the instruction. All fees are paid in advance, but poor students, by making application to the proper authorities, can obtain partial or total remission from payment. It must be technical or industrial knowledge that enables the Swiss to forge ahead of more favoured nations, though they possess no mines, canals, or navigable rivers. True, they command water power, and it is utilised by turbines. The Swiss have to bring the raw material, and send their manufactures long distances to the sea-board, and yet they successfully compete with other countries, and in sundry cases outstrip them. In Germany evening instruction is of a varied and practical character, various schools and classes existing. The Berlin Handwerker Verein was founded in 1859 to promote among its members general culture, sound knowledge of their crafts, and good manners. An important Building Trades' School is connected with the Berlin Artisans' Society. To the cost of this school the Minister of Public Instruction contributed 255*l.*, the Municipality 125*l.*, and other moneys came from a bequest. In this flourishing society, on the visit of the Commissioners, were 148 carpenters, 131 tailors, 95 locksmiths, 82 masons, 75 book-binders, and 681 commercial and other clerks. The total expenditure for 1881-2 was about 1,500*l.* The Building Trades' School is purely a winter school for students of the building branches. The Handwerker Schule of Berlin is a good example of a technical evening drawing-school for artisans. There are twenty-five masters in this school, which is a Government one. It is attended by 470 apprentices and 190 journeymen, who are in all cases recommended and introduced by their employers. Students begin by making outlines from small wooden hand models. In addition to the ordinary teaching of drawing, there is special instruction for each trade by teachers practically acquainted with that trade. Artisans learn projection from models, and from models they pass to plaster casts.

The best evening schools in Austria are the Turners', the Jewellers', and the Building Trades' school in Vienna, which are guild schools. The turners' school is specially a school for apprentices, having 170 pupils divided into two sections, one theoretical and the other practical. It is supported by an influential trade society numbering 1,500 members. The membership of the Turners' Society is compulsory on all master-turners, and the apprentices are bound to attend the school. The term of indentures in this trade varies from three to five years. It is usual after leaving the primary school, at thirteen or fourteen, to go into practical work for a twelvemonth, in order to obtain some power of manipulation, and then enter these classes. The first year the pupils learn drawing, arithmetic, elementary physics, book-keeping, and the technology of their trade, raw material, &c. Modelling, carving, and all the different kinds of turning are learned in the second year. A good reason was assigned by the director of the school for the necessity of the instruction given in this school. It was to the effect that in the workshop the pupils are continually occupied with one kind of work, and thus they never gain a general knowledge of their trade. Unfortunately, this is the case in several of our trades in England, owing to the extensive application of machinery resulting in the splitting up of trades into a number of divisions. This may be good for capitalists, and lead to increased production, but it is destructive to the maintenance of a class of general workmen highly skilled and knowing their trade as a whole. As a rule, evening instruction for artisans in Austria is not as in

* See p. 849, *ante*.

France and Belgium, supported by the municipalities, but mainly by the trade societies.

In respect to Belgium, evening art instruction for artisans is represented at least by four important schools, with an average attendance little short of 1,200*l*. The boys begin by drawing geometrical forms with chalk on blackboards, passing on to drawing similar forms with charcoal on sugar paper, outline drawing being first practised, and subsequently shading from the cast. In the third year they are led to drawing from life. The drawing, in quality, is well suited for craftsmen, and owing to the rapidity with which the work is performed, they acquire, in the opinion of the Commissioners, sufficient power of drawing for their purpose in a far shorter time than is possible under any art system existing in this country. The evening art instruction in Holland is similar to that of Belgium; but in Holland, as well as in Belgium, there are day apprenticeship and artisan schools possessing noticeable features. In most of the towns of Italy there are evening classes for workmen similar to those described in relation to other Continental countries. The Commissioners are of opinion, however, that in regard to evening science classes or teaching there seems to be nowhere in Europe any systematic evening instruction comparable, as regards the number of subjects taught and the facilities afforded for the establishment of the classes, and for the examination of the students' work, with that undertaken by the Science and Art Department of this country, and recently supplemented in the application of science to special industries by the City and Guilds of London Institute. Notwithstanding this statement, the Commissioners presently acknowledge that in many of the towns visited on the Continent the evening science teaching was conducted by professors of higher standing than, and superior scientific attainments to, the ordinary science teachers who conduct courses in some of the largest and most important manufacturing centres of this country. It is also noted, in case of machine construction, that the models and materials for instruction were superior to those found in similar schools at home.

Coming to the artisans' general technical schools and apprenticeship schools, they form, indeed, a very remarkable class in the Continental system of industrial education. They are, firstly, intended to supersede apprenticeship wholly or partially by a progressive system of workshop instruction in the school itself, and these are considered the true apprenticeship schools; secondly, there are the trade schools for apprentices and journeymen engaged in workshops. These two classes of schools are to be found in most of the European countries we have already enumerated, but it would require more space than we can afford to treat of them in detail. Some brief particulars concerning a few of them, including the building trade schools, must suffice. The school of La Villette, in Paris, is a good type of the first-named class. It is a municipal school for workers in wood and iron. Youths are admitted on presentation of the "certificat d'études" of the primary school, or on passing an equivalent examination. The instruction is free, and is a continuation of that of the primary school and special technical training. The manual work is divided into two courses, in the first year the pupils spend six hours in the shops daily, where they are taught the nature and conversion of materials. In the second and third years the pupils spend six and eight hours per day in the shop, and are engaged in actual construction with the special trade which they adopt. A large proportion of the boys become engine-fitters or p ttern-makers, and earn wages, it is stated, arying from 2s. 6d. to 5s. per day, on leaving chool. The Havre apprenticeship school is of the same type. In Switzerland, although the watch-making industry gives rise to several small schools, no apprenticeship school of the character obtaining in France exists. There are several apprenticeship schools in Germany for the training of workmen, or foremen, wherein instruction in pure and applied art, combined with practical work in the shops, form an important feature in the course. The Royal Trade School, Iserlohn, is a school in which industrial art adapted to metal work is combined with handicraft teaching. Westphalia, the district in which this school is located, abounds in ironworks and collieries. The pupils in this school go through a three years' course, and are trained as designers, modellers, wood-carvers, moulders, founders, turners, pressers, chasers, engravers, gilders, and etchers. The subjects of construction are in part theoretical and practical. The school is well fitted with workshops and the necessary appliances. The Trade School at Remscheid is one recently established for the instruction of apprentices in the construction of edge tools and other implements. The morning hours are devoted to instruction in the ordinary school subjects, including the elementary principles of science as well as drawing and design in application to the requirements of the trade. There is a practice from two to seven in the afternoon in the shops. The fees paid by the students amount to 4*l*. a year. There is a pottery trade school at Höhr, near Coblentz, to assist a small local industry; a trade school at Cologne for the sons of tradesmen and superior artisans; and apprenticeship and trade schools in the Black Forest, in the Grand Duchy of Baden, the seat of a large number of home industries. The Trade School of Cologne (Gewerbliche Fach Schule) is divided into three departments, comprising engineering and architectural drawing, modelling, and decoration, including house-painting. For certain trades the course of instruction is specialised. Again, such industries as clock-making, straw-plaiting, wood-carving, &c., have their schools. At Furtwangen exists a junior school for training cabinet-makers, to which the pupils of the carving-school are sent on one day in the week to learn the principles of furniture construction. Village industrial schools similar to those of Baden exist throughout Bavaria, including weaving, wood-carving, basket-making, pottery, and violin-making. It was only recently that an extensive movement was set on foot in Austria by the Government to establish apprenticeship schools, and there were, up to a few months ago, no fewer than eighty-four schools existing for the teaching of various industries chiefly situated in small provincial towns. Next there is a joiners' school at Vienna, for joiners and woodworkers, which is mainly a winter school, and a school for woodworking at Riva. In reference to the beneficial influence of apprenticeship schools in Austria, Dr. Exner, the secretary of the Lower Austrian Trade Association, and who is the Government Inspector of the Fachschulen, or School of Woodwork, and a member of the Austrian Parliament, states that in some cases new industries have been created by the action of such schools. The Fachschulen have been created to remedy, it is said, the acknowledged defects of the apprenticeship system, and Dr. Exner thinks that apart from the introduction of new handicrafts, their effect has been to develop industry to a great extent in Austria. The defects of the old apprenticeship system of late years are obvious at home and abroad, owing to a variety of circumstances which have often been alluded to in this journal, but these defects do not import that the normal system of workshop training is not the best, provided the apprentice has received previously a good elementary education. There are a number of apprenticeship and artisan schools in Belgium at present. They are free, and are mainly supported by Government and municipal grants. The instruction varies in different schools, being in accordance with the requirements of local industries. There are certain special classes to enable workmen to obtain certificates of competency in sundry branches of industry, drawing being the basis of all instruction, and being regarded as the universal language. The Antwerp Industrial School contains 150 pupils, in five classes. The pupils enter at the age of fourteen and upwards, and remain four or five years. Most of the pupils have already spent more or less time in the workshop, gaining there some familiarity with the practical details of their trade. In the Belgian trade schools specially designed for workmen engaged during the day in their various handicrafts, there is an absence of manual work. The apprenticeship schools in Holland are at Amsterdam, Rotterdam, the Hague, and Arnheim. Candidates for admission to the Ambachts School, Amsterdam, must be at least eighteen years old, produce a certificate of good conduct, and must have received a satisfactory elementary education. This school was founded by private initiative effort in 1861, for the purpose of teaching handicrafts required in house and ship building. The apprenticeship schools in Holland all receive Government aid, but depend for their maintenance to a certain extent on local subscriptions. In the Ambachts Schools, Rotterdam, articles made in the school are sold to dealers, and orders are executed for the local authorities. Many doors and window-fittings are made for builders, and a variety of builders' ironmongery is produced, as well as other metal-work.

In Italy, though there are technical institutes, no apprenticeship schools proper exist. In a conversation which the Commissioners had with the representative of the Education Department at Wurtemberg, they were informed that there were no apprenticeship schools at that place like the apprenticeship schools of Paris, or the industrial schools of Bavaria. The authorities have held (and, it appears to us, very wisely) that the best place for teaching a trade or manual labour in any form is the regular workshop. They believe at the same time that science and art are subjects which should be taught to the workman, and that a knowledge of theory should go hand in hand with practice. The all-important problem with the Wurtemberg authorities is,—(1) how to give a sound education to all young artisans as they grow up; and (2) to do so without interfering with their daily labour. They are attempting to solve this problem by starting evening and Sunday schools, with the curriculum arranged to suit the wants of apprentices and workmen in each locality. The boy leaves school in Wurtemberg at fourteen, and becomes an apprentice till eighteen,—a term too short except for a few trades or sections thereof. During his apprenticeship the youth attends the Fortbildung, supplementing his earlier education in ordinary literary subjects, and acquiring scientific knowledge bearing upon his trade and drawing. More advanced pupils pursue methods similar to those of the Science and Art Department in this country. The intermediate technical schools for foremen and technical managers, with their divisions into general technical schools, weaving schools, and industrial art schools, and their subdivision into higher elementary technical schools, secondary technical schools, and building, engineering, and mining schools, form a varied and remarkable group of institutions in some of the European States. We can only give a passing notice to the building trade schools existing in Germany, at Stuttgart and Dresden, and in Austria at Vienna. The school at Stuttgart is divided into two mathematical preparatory courses, and three special science divisions—(1) for those engaged in the building trade, (2) for land surveyors, and (3) for mechanical engineering. The pupils pay 36s. per half-year, and no one is admitted under fourteen; while many, having been engaged in practical work, are of mature age. This is in no sense an apprenticeship school, as no practical work of any kind is attempted, but the subjects of instruction are numerous, and with special relation to architecture, engineering, and building construction. The building trade school of Dresden is somewhat similar. There are two types of building trade schools in Austria, the State Trade Schools and the Foremen's Schools. Some of these are only winter building schools, but others embrace a wider range of instruction, and are intended to train men generally for intermediate posts in industrial work. Firstly, the pupils are required to have a fair preliminary education; secondly, the instruction is chiefly, if not exclusively, theoretical; thirdly, throughout the entire course of instruction great attention is paid to freehand and geometrical drawing;

fourthly, the most of the students are, or have been, practically engaged outside the school in the work of their trade. Parents make great sacrifices for the education of their children, and the young men themselves work hard during the summer months, to save sufficient money to pay their school fees as well as support themselves when work is slack during the winter.

The Commissioners at some length dilate on the influence of technical instruction in certain branches of chemical industry, including chemical colours, beet sugar, and the alkali trades, giving some noticeable illustrations. The great influence of art schools, galleries, and museums on the Continent available to workmen is also dilated upon. Institutions of this kind in the British Islands are still only in their infancy in the provincial districts, though Birmingham, Liverpool, Nottingham, and, more recently, Manchester, have provided art galleries, and a few interesting collections exist in other large towns.

The portions of the Commissioners' Report devoted to visits to industrial establishments on the Continent, and to various institutions in the United Kingdom, embody a very large amount of useful and instructive information dealing with the science and art teaching of numerous schools, colleges, universities, and institutes. There is frequent mention throughout the Report of the Science and Art Department, what it has done and is doing for the country, and of those other institutions in affiliation with it. It is, perhaps, not to be wondered at that the Commission, or some of the members thereof, should have such high hopes concerning the City and Guilds of London Institute and the Finsbury College, &c.; for are they not claimed to be the children of more than one technically enthusiastic brain? Let who like claim the credit, but thus much we know at least, that a good many years since we mapped out the way for the City Guilds, and repeatedly gave them the advice which a number of them have considered it to be their duty to act upon at last. The City and Guilds of London Institute is intended for all classes engaged in industrial operations,—of artisans, apprentices, foremen, managers of works, manufacturers, and technical teachers. The Council aver that they have no intention of interfering with any existing social institutions, such as apprenticeship, or any other relationship between employer and employed. The aim is to supply further instruction by preparing pupils to more thoroughly profit by workshop training. The Finsbury College, opened in 1883 is designed to serve as a model trade school for the instruction of artisans, and for others intended for intermediate posts in industrial work. In consists of schools of applied science and art. The schools at Elswick, established by Sir William Armstrong; those of the London and North-Western Railway, at Crewe; and Messrs. Mather & Platt's, at Salford, in connexion with their engineering works, testify at least that these large employers attach great importance to the theoretical training of young artisans. In Glasgow, among other towns, the Allan Glen's Institute and the Glasgow College of Science and Art (originally a mechanics' institute) are noticeable institutions. An especial feature of the former school is workshop instruction in the use of tools, a good secondary and technical education also being placed within the reach of middle-class boys. The second named institution has now become one of the most important in Scotland for the evening instruction of artisans, foremen, and others in applied science and art. The Watt Institute and School of Art, Edinburgh, is an important evening school, but it needs funds to become more useful in the field of technical education. Although many of the old and once very useful mechanics' institutes have died out, a number of those remaining are remodelling their constitution in order to keep it level with the needs of the time. In the earlier portion of their "conclusions," the Commissioners say that "great as has been the progress of foreign countries, and keen as is the rivalry with us in many important branches, we have no hesitation in stating our conviction, which we believe to be shared by Continental manufacturers themselves, that, taking the arts of construction and the staple manufactures as a whole, our people still maintain their position at the head of the industrial world." This is a courageous and encouraging statement. In reference to the foreign system of technical instruction, the Commissioners think that it is not applicable to this country as a whole, and that it should not be introduced without considerable modification. Not only is there a great difficulty, in our opinion, in the way of introducing the foreign system of technical instruction into this country, but there are considerable obstacles in the way of establishing firmly our own at present limited system, though well intended. Long before the cry of education was heard of in the streets, capitalists were combining, and, by the aid of machinery, were revolutionising the labour market. The skilled artisan soon felt that power was steadily thinning their number as general workmen, while multiplying them otherwise as mere sectional hands. Thus we stand to-day face to face in the United Kingdom with a large army of workmen knowing individually only a fourth, an eighth, or a twelfth part of their trade. Let all those youths have by all means a useful education; but how are we to afford them facilities for applying their technical knowledge, supposing they have acquired it, to be foremen or departmental managers, with experience in a workshop or factory, as well as scholastic or theoretical knowledge? The best foremen are those who have graduated for seven years in the workshop, provided they have had a fair elementary education. As regards the building trades, particularly the carpentry, joinery, masonry, bricklaying, plumbing, and plastering branches, the best and most fitting training schools are the workshop and the building in progress. Much may be learned in classes, no doubt, but the workshop bench and the building constitute the most efficient normal schools of handicraft. We consider also that some steps should be taken to encourage and maintain the system of regular apprenticeship. Owing to our advanced systems of industrial education the time of servitude for the apprentice could in most cases be considerably shortened. No difficulty really stands in the way of retaining the system subject to some slight modifications.

In his Report on the schools and factories of America and Canada contained in Vol. II. of the second Report, Mr. Mather assigns greater influence on American manufactures to the general education of the American people derived from their common schools than to their technical schools. The conditions of American industry are, however, in many respects different to those existing in this country. In respect to School Boards in this country it is stated that they should be authorised to establish and conduct science and art classes for artisans. In regard to Ireland the Commissioners were much impressed with the remarkable success attending the system carried out by the Christian Brothers and that of the ladies of religious orders in training children and young persons in handicrafts in Industrial Schools and similar institutions. Manual instruction in the use of tools in Irish primary schools is advocated, and it is thought that artisans might be employed to teach. Compulsory attendance in primary schools is also recommended for that country. The final "Recommendations" which, in the opinion of the Commissioners, require the intervention of the Legislature, are in relation to the wants of public elementary schools, classes under the Science and Art Department, training colleges for teachers, secondary and technical institutions, public libraries and museums, and some special regulations in regard to Ireland, some of which we have already alluded to. Some supplemental general recommendations are also submitted for consideration, and with these the report ends. The length of this article precludes us from indulging in any further independent observations in addition to those made in the course of our subject, but we may, on an opportune occasion again take up the text of technical education, and show some of those bearings on the future of our artisans and our skilled industries which appear to have been overlooked by the Royal Commissioners.

THE VALUE OF HOUSE PROPERTY IN ENGLAND, AND ITS GROWTH IN A DECADE.

THERE is some practical interest to architects, as well as to others connected with building, in ascertaining what is the approximate value of house property in England, what is the sum annually spent in the increase of that property, and in what parts of the country, in urban as well as in rural districts, the principal building movement is going on. While much of this must be, to some extent, matter of estimate, the means exist of obtaining an approximate answer to the question suggested. But the data existent are divided under so many distinct branches of inquiry that the comparison is somewhat tedious. There are independent Parliamentary returns, not by any means of annual issue, to be consulted, together with the Census returns, the reports of the Local Government Board, and those of the Registrar-General. And when all these sources of information have been consulted and compared, there still remains the open question of the relation between capital invested in house property, and the interest on the same received by way of rental. In some official estimates on which great reliance has been placed this is taken as 10 per cent. We fear that the owners of house property as a mass, if consulted, will by no means admit that such a relation really exists; or even that the more modest ratio of 8 per cent., which used to be taken as normal for house property, now generally obtains. It will probably be safer to take 5 per cent. as the approximate return,—a ratio which, in any case where more exact information is attainable, it will be easy to correct, and which allows of a comparison with other modes of investment which is tolerably exact.

In the census of 1881, 4,833,844 inhabited houses were enumerated in England and Wales; which gave shelter to 25,968,286 persons, or at the rate of 5·37 persons per house. In the twelfth annual Report of the Local Government Board (C. 3,778, p. cxlvii). the gross rental of the same was estimated at 165,143,300*l.*, and the rateable value at 139,636,307*l.*; or 15¼ per cent. off the gross rental. If we capitalise the rental at 5 per cent., we have a resulting value of 3,302 millions sterling for the capital value of the property in question, a total which, of course, has to be abated as matter of actual outlay, but hardly so as matter of present value, if we consider the annual earnings by way of rentals to be more than 5 per cent.

On this showing, the average rent paid per head of population in the year 1881-2 was 6·35*l.*, and the average rent per house was 34·16*l.* Capitalised at 5 per cent., the cost of housing each family of 5·37 persons was 684*l.*, or, per individual, 127·23*l.* If house property pay 10 per cent., as estimated in the official returns referred to, the corresponding values would be 342*l.* per house, and 63·6*l.* per individual

If we now cast back a glance to the year 1871, in order to see what has been the change effected within the decade, we find that the increase of the population of England and Wales has been 14·34 per cent. (C. 2,955, p. iii.), being equal to the addition of 3,256,020 persons to the population enumerated on the 3rd of April, 1871. The number of inhabited houses in that year was 4,259,117, and the gross estimated rental (C. 3,778, 1883, p.cxlvii.), 126,473,924*l.* The number of persons per house in 1871 was 5·33, and the capital value, (on the 5 per cent. allowance) was 593·8*l.* per house, and 111·41*l.* per individual.

On comparing the growth of the population with the increase in the cost of housing an individual, a remarkable coincidence is now to be detected. In point of fact, the increase of value per head is almost exactly the same as the increase of density of population. While

the people have thickened on the ground by 14·34 per cent., the price of housing each individual,—or, at all events, the average gross estimated annual rental for each individual,—has increased by 14·2 per cent. A coincidence of this nature, spread over the area of England and Wales, is not likely to be fortuitous. If it be the expression of a natural law, it is one of extreme statistical value. It is, therefore, desirable to ascertain, as far as practicable, whether the same relation between density of population and rental prevails between different parts of the country in the same year, that prevails between the general average of the whole country in years a decade apart.

The Inner London of the Registrar-General (C. 2,955, 1881, p. 7) covers an area of 78,080 statute acres; while the total area of the thirty metropolitan unions is stated by the Report of the Local Government Board at 75,313 acres. As the populations enumerated in these two discordant returns are identical, it is possible that the area covered by water is included in the former and not in the latter acreage. On this area existed, in 1871, 417,767 inhabited houses, occupied by 3,254,260 persons. In 1881 the houses were 486,286; the inhabitants, 3,814,574. The gross estimated rental of this property in 1871 was 24,103,083*l.* (C. 3,778, 1883, p. cxlviii.); and in 1881 it had risen to 33,384,851*l.* It is difficult to state the true mean for the densities of this large province. In the thirty unions of which it is composed, the number of individuals per house varies from 6·1 in the Lewisham Union to 11·4 in that of St. Giles and St. George. The mean of these extremes is 8·75. The mean of the thirty separate unions is 8·11. The mean arrived at, as in the case of all England, by dividing the total population by the number of inhabited houses, is 7·85 persons per house.

Taking the last-named proportion, or that for the whole area (although it may be considered as under-rating the true pressure of population) for comparison between the years 1871 and 1881, we find that the density, so measured, increased from 7·78 to 7·85 persons per house; the average density being about 46 per cent. more than that for the whole country. The gross estimated rental above cited averaged 57·7*l.* per house in 1871, and 68·2*l.* per house in 1881, being respectively equal to 148*l.* and 173*l.*, for the capital cost of housing each individual. This cost, therefore, was close upon 17 per cent. higher in the latter than in the former year, an increase which almost exactly coincided with the increase of the population housed upon the same area.

It is perhaps beyond the reach of statistical analysis to determine the exact relationship between density of population and cost of housing, for the reason that the same rule can hardly apply in urban and in rural districts, and that it is impossible at present to ascertain the proportion of land that is devoted to residential use. The valuation for the poor-rate in 1881-82, while distinguishing each parish and union, gives neither areas nor numbers of houses, and it is not clear how closely the registration districts and sub-districts named in the census which gives these important details coincide with the parochial limits. The number of houses per area is one element of comparison, in like, but not in unlike, circumstances. The same may be said of the number of persons per house, and again of the number of persons per acre. In the union of St. George's-in-the-East these respective densities are,—23·9 houses per acre, 8·1 persons per house, and 193 persons per acre. The rateable value in this union is 34·3*l.* per house, which may represent an actual rental of 41·5*l.*, or a little over 5*l.* per head. But a very different kind of density is presented by the City of London, in which, while there are now only ten houses per acre, and a registered population of 7·8 persons per house, or seventy-eight persons per acre, the rateable value rises to 68·8*l.* per head, or a rental of 83*l.* per individual. In this case, however, it is the fluctuating day population which demands this large and costly accommodation. The Metropolitan, the Metropolitan District, and the North London Railways carry some 373,000 passengers per diem to the metropolitan centre. The metropolitan bridges give passage to a still larger number. Thus the 51,306 residents enumerated as the population of the City of London in 1881 represent, by their rental, accommodation for far more than ten times their numbers. It is for custom, rather than for residence, that the houses in this district have been reared of such noble dimensions as to have a mean rateable value of 541*l.* each.

In the suburban union of Lewisham, on the contrary, with an area of 11,436 acres and a population of 73,314, is reared little more than a house per acre, tenanted by little more than six persons each. The rateable value per house is 52·3*l.*, or 8·5*l.* per individual, being almost double the rateable value of the union of St. George's-in-the-East, where, as we have seen, the number of persons per house is 8·1.

These considerations are adduced in order to put the reader on his guard against either taking too hasty a leap to conclusions, or thinking that what we have to suggest as a roughly approximate rule can be taken, in any particular case, without ample provision for correction and verification. This premised, and as an attempt merely to strike out the line of country hereafter to be more accurately surveyed, the figures above cited, compared with a mass of others of the same kind, point to the fact that rent and rateable value are determined by density of population, partly measured per area and partly per house. Both have to be considered, and it is sometimes the one and sometimes the other which becomes most marked in its effects. But we shall not, perhaps, be very wide of the mark if we regard the allowance of 1*l.* per head per number of inmates in a house as coming somewhere between gross rental and rateable value. Thus, for London, the "Inner London" of the Registrar-General, with a general average of 7·85 persons per house, we have an average rateable value of 7·21*l.* per person. For all England, with an average of 5·37 persons per house, we have a gross annual rental of 6·35*l.* per individual.

The proportion between gross rental and rateable value is not everywhere the same. Some counties rank much below the average. The twelfth report of the Local Government Board states that Bedford, in its gross estimated rental at the latest date, was 21·17 per cent., Lincoln 23·99 per cent., and Anglesea 33.22 per cent. under the gross annual value stated in Schedule A of the Inland Revenue returns. In the metropolis, however, the poor-rate valuation in force is only 0·07 per cent. short of the Crown assessment. In the valuation to the poor-rate in all England the rateable value fell short of the gross estimated rental by 15·8 per cent. of the latter in 1871, and by 15·4 per cent. in 1881. In the metropolis the rateable value fell short of the gross estimated rental by 17·7 per cent. in 1871, and by 17·5 per cent. in 1881. These proportions, being calculated from the data of the Local Government Board, are exact, as showing the differences between 1871 and 1881, and as between the metropolitan area (calculated for Lady Day) and England generally (calculated for the 6th of April, 1881).

A rateable value of 7·21*l.* per head in London compares not unfavourably with that given by Sir J. W. Bazalgette, in his address at the Institution of Civil Engineers on the 8th of January last, for some of the most important foreign cities. Thus in Philadelphia, with a population in 1880 of 847,170, the figure cited in the address is 8·7*l.* per head. In Paris, with 2,240,000 people, it is 10·7*l.*; in New York, with 1,206,000 persons, 11·2*l.*; in Brussels, 11·4*l.*; in Boston, 17·85*l.* The numbers of inhabitants per house vary to an extraordinary degree in Sir Joseph's table, from 3·9 in Chicago to 65·5 in Turin. The numbers given for the population of the American cities differ materially from those given in the statistical tables by Mr. J. J. R. Croes, published at New York in July last. As the figures stand in Sir Joseph's table, no relation is visible between the number of persons per house and the rateable value per individual. But considering the different habits of different countries (comparing, for instance, London and Naples, for which latter city Sir Joseph's figure of 4·4 inhabitants per house is notoriously inadequate) it is not likely that a rule can be very general. It is more to the purpose to observe that of the forty-five cities tabulated by Sir J. W. Bazalgette, London, with its death-rate of 21·4 per 1,000, is the healthiest of all, with the single exception of Christiana. It is also the city, out of all English and American towns of more than 200,000 inhabitants, in which the works for a supply of water have been provided at considerably the lowest cost per head of the inhabitants, and in which the payments made for water are the lowest in proportion to the rateable value of the property.

These considerations are of extreme significance as regards the future course of domestic building in this country. Who is there who, on learning that London doubles its inhabitants in forty years, has not asked himself, where will this stop? Will the bounds of the metropolis gradually enlarge until, at some not incalculable date, they meet those of other great centres of population? Or will some unexpected element of dispersal come into operation to throw the mass of new building on rural rather than on metropolitan areas?

As to this important question, the figures above cited, at all events, hint a reply. If rents continue to increase in proportion to density, as they have done since 1871, the rents over a large proportion of the metropolitan area in the year 1902 will be double those of the year 1881. It may well be questioned whether the law thus indicated, as having certainly prevailed for the last decade, may not carry with it a limiting power. Year by year, as pressure on metropolitan space raises the rate of rent per head, will it become more and more important to inquire whether the advantage of residence in London is worth the cost. Nor should it be forgotten that the ultimate perfection of the telephone may be expected to exert a very considerable influence on the distribution of population. When it becomes possible (as we can hardly doubt will be the case) to communicate with a broker, banker, or other man of business, vocally, from forty or fifty miles' distance as readily as from a suburban residence, one of the elements inducing concentration will be changed. We make no attempt to forecast the future. It is quite another thing to call attention to ascertained facts and to causes of change in actual operation, and to observe what is the tendency of actual movement and change.

Taking the very latest facts on record, the increase of the gross estimated rental for all England in the year 1881 was hard upon five millions sterling, while that for London was nearly three millions sterling. The comparison is very remarkable, especially when we remember that the proportion of inhabitants is twenty-six millions to less than four millions. The exact figures are: Population of England and Wales in 1881, 25,968,286; gross estimated rental in all England (on poor-rate valuation), 165,143,300*l.*; population of "Inner London," 1881, 3,814,574; gross estimated rental, 33,384,851*l.*; increase of population of all England for a mean year of the decade 1871-81, 1·43 per cent; increase of London for a mean year of the past decade, 1·72 per cent.; increase of nineteen principal English towns for a mean year of the past decade, 1·65 per cent.; increase of gross estimated rental for all England, in the year 1880-81, 2·96 per cent.; increase of the gross estimated rental for London, in the year 1880-81, 8·89 per cent. It should be observed that this last rate of increase is exceptional. From 1871 to 1881 the gross estimated rental of London increased by 38·5 per cent., or at the mean annual rate of 3·85 per cent. But the years 1871, 1876, and 1881 have been exceptional in their rates of increase, showing per centages of 8·16, 7·35, and 8·89 respectively. In 1874 the increase was only 1·56 per cent., and in 1878 1·93 per cent., on the preceding years. This fact has no little significance as indicative of the fluctuations in the activity of the building trade, if it have any other cause than the operation of the revision of the rate-books.

Put in the simplest way, as matter of ascertained fact, without any speculation, the increase in the value of the house property of England, from 1871 to 1881 was at a rate of from 7 to 10 per cent. more than twice the increase in the population,—a difference that may probably be taken to measure the growth of individual luxury. The slight difference of 3 per cent. is that between London and all England. In the former, in the decade, population increased 17·2 per cent. ; gross estimated rental 38·5 per cent. In the latter, population increased 14·3 per cent., and gross rental 30·6 per cent. It is, of course, desirable to extend the comparison over a larger term of years. The above cited facts, however, are all that are at present accessible, and of their significance there can be no doubt.

THE BUILDING MATERIALS OF AMERICA.

SOME eighteen or twenty years ago a very valuable record was issued, by the English Geological Survey, of the Quarries and Building Stones of the United Kingdom, and although it was confessedly incomplete, it is much to be regretted that the publication was not continued. It was the old story of expense and no money,—the usual manner in which we in England deal with matters of real utility, while we spend like water for doubtful political purposes. Americans are far before us in these respects, and the frequent reports of their material resources are models of what a country should do. What strikes every student of the United States is, not so much the enormous riches that that great continent possesses in silver and gold (a Tom Tiddlerish way of looking at things which takes the multitude, and is always brought prominently to the front), as the more homely wealth of the earth's resources,—wealth that, in the glare of Californian and Colorado discoveries, was completely thrown in the background. But now that gold and silver have taken their proper places as mining undertakings, the Americans have time and opportunity to examine into the condition of their other mineral treasures, and they may well congratulate themselves on the universal presence and abundance of nearly every metal and rock that are known to science. Although the enormous superficies of the States permits the various formations to extend for long distances, there are some parts,—such as the Rocky Mountains, where the areas of disturbance have been profuse, causing every variety of alteration in the character of the rocks, and an unequalled scope in the choice of ornamental building stones.

The building-stone quarries of America (not including those of limestone for the purposes of flux and lime-burning) are estimated at 1,525, and the product during the census year at 115,380,133 cubic feet, valued at 18,356,055 dollars ; and as there are a good number of little quarries worked by one or two hands, of which no account was taken, the annual value of the stone may be certainly placed at 20,000,000 dollars. These quarries are thus tabulated :—

	Quarries.		Cubic Feet.
Crystalline and silicious rocks	313,	yielding	20,506,568
Sandstone	502,	,,	24,776,930
Limestone and marble	616,	,,	65,523,965
Slate	94,	,,	4,572,670

In the first category are included granite, trap, steatite, porphyry, gneiss, serpentine, syenite, &c., Massachusetts and Maine taking the lead with ninety-two and sixty-eight quarries respectively, followed by New Hampshire, Connecticut, Rhode Island, Vermont, and Virginia. These States are the principal areas of that great belt of eozoic rock which enters America from Canada, and forms the backbone of the Appalachian range, dying away in the south as low down as Georgia and Alabama. Maine possesses inexhaustible stores of excellent granite, mostly dark coloured and porphyritic ; in Massachusetts, it is lighter coloured and rather finely grained (that of Monson being noted for its large monoliths) ; New Hampshire has immense quarries at Concord, its capital, with a wide reputation for quality, and which have been worked continuously for 100 years and more, and there is a remarkably good red granite quarried at Saint Johnsbury Mountain. In fact, the whole of the White Mountains and of the Adirondacks in New York State are of granite, and would supply the requirements of the entire globe. The State House of Vermont is built of fine-grained granite from Barre Hill, serpentine being also largely quarried in the same State, and syenite in that of Maryland. Virginia possesses a number of quarries of grey granite and pink gneiss ; as also, though to a smaller extent, does North Carolina. The Western States, consisting largely of level prairie and low river grounds, do not contain granite, or, indeed, any great variety of building stone ; but as we approach the vast chain of the Rocky Mountains, we find it in great abundance. It is extensively developed in Colorado, to the west of the Hogback, a wedge-shaped outlier which runs from the Spanish Peaks into Wyoming. The district possesses a vast variety of granites, mica slates and schists, hornblende, felspathic rock, syenite, and porphyry, all of which are largely used for foundations and bridge structures. Some of the dikes furnish red crystalline rock, which is susceptible of a high polish, and very valuable for ornamental work. A favourite building stone in Denver is a fine pink lava, from Douglas County, and a brisk trade is arising from shipping it over the Denver and Rio Grande Railway. There is no lack of granite in California, especially in Placer County, and at Penryn, on the Central Pacific Railway, some twenty-eight miles from Sacramento. It is to be hoped that as time goes on, granite will be more used for building purposes, the houses of the Far West being, as a matter of fact, principally constructed of wood, owing to the vast supplies and cheapness of lumber, though at the same time the foundations are mostly of brick or stone. There is, however, a considerable demand for granite in San Francisco and the largest cities for curbing the sidewalks and street-crossings. The Penryn quarries are amongst the most extensive of the kind in the States, covering some 680 acres, and employing 200 hands. The great reputation of the Penryn granite arises from the fact that it does not change colour by exposure, and that it contains no iron, and this gives it a great superiority when used for monuments, tombstones, or when placed in any position where it is much exposed to the atmosphere. The prevailing shades of the Penryn granite are blue, grey, and black, the latter resembling the black granite of Egypt, and taking a beautiful polish.

Limestone and marble are found in almost all the States, there being 616 quarries, employing 15,646 hands, 190 quarrying-machines, and 499 dressing-machines. Judging from the statistical returns, Iowa presents the greatest activity in limestone quarrying, heading the list with 128 quarries, and succeeded by Ohio with 119. Indiana possesses 65, Wisconsin 46, after which the numbers become small. Taking the States in their alphabetical order, we find that Alabama possesses an excellent white marble, known as "Talladega," as also gray and white non-crystalline varieties, and variegated marbles, all of sub-carboniferous age. Besides these there are magnesian limestones and yellow crystalline marble of tertiary date. Arkansas has an oolitic limestone that takes a good polish ; Connecticut has some quarries of dolomitic marble ; while the limestone of Florida is of a coralline nature. In Illinois the quarries are of carboniferous age, and yield a great deal of good building stone, that known as Lemonte marble being very largely used in the building of Chicago. The Indiana stones are upper silurian and oolitic freestone, and those of Iowa are carboniferous and magnesian. Kansas possesses some very fine black marbles and cream-coloured dolomitic stone, soft and easily dressed. Similar material is also found in Kentucky, together with freestone and limestones of lower silurian formation. In Maryland are a valuable brecciated limestone, known as Potomac marble, and a verd antique, which is extensively worked in Frederick County. Massachusetts furnished from her quarries at Lee the limestone used in the building of the Capitol at Washington ; and New York State is well supplied from the Eastchester and the Sing Sing quarries, as also from the many outcrops of white crystalline limestone of the northern highlands. The cities of Cleveland and Toledo in Ohio are, in a great measure, built of the well-known Sandusky limestone ; but in Cincinnati a limestone of the upper corniferous division is most in request and largely worked in the quarries in the neighbourhood.

In the Rocky Mountains and all through the Pacific States, marble is very profuse, and of varied quality. The Hogback, which has been mentioned before in connexion with granite, is composed of cretaceous or Jura-triassic formations, and is an inexhaustible source of fine building stone, with two separate parts, formed wholly of limestone ; and throughout Colorado generally, there are quantities of breccia, white, apple-green, and clouded marbles. In California there are also great deposits in Tuolumne County,—masses weighing 600 tons having been blasted out, and single blocks dressed, weighing 13,000 lb. Most of the stone is of an unclouded white, but all is fine-grained and extremely hard. Near Suisun, there is a singular stone, which, in its rough state, looks very like rosin. It occurs in heavy beds, blocks measuring from 800 to 900 cubic feet having been frequently raised. On the McCloud river, there is a pure white marble, fit for the most delicate purposes of statuary, though it has been but little worked. It is singular that, with such a profusion of excellent marble throughout the State, the Californian demand, which is always heavy, has been, up till now, met by importations from Italy. Probably, however, when a greater depth of working has been attained, marble equal to the finest Carrara will be readily found. The Californian quarries also yield handsome specimens of Cipolin marble, white, with shadings and streaks of green, together with the Porton or Genoese yellow ; and there is a variety known as Ruin marble, a yellowish stone with broken lines, very much resembling the ruins of fortifications.

Sandstone is very generally found throughout the States, but is worked to the largest extent in New York, Ohio, and Pennsylvania, which possess 181, 126, and 95 quarries respectively. The Ohio quarries are on the most considerable scale, having between three and four million dollars invested in them, and with an annual yield of nearly nine million cubic feet. Kentucky, too, possesses vast stores of sandstone in the basin of the Cumberland river, and an excellent stone on the Kentucky and Green rivers, known as Buena Vista stone, of which considerable portions of Louisville and Cincinnati are built. One of the best stones in America for building purposes is the Potsdam sandstone of New York and New Jersey, the latter State containing also a very durable conglomerate known as the Green Pond Mountain conglomerate.

In the Pacific States, sandstone is not so widely developed as limestone, although there are several deposits of very handsome varieties. One of these, a fine-grained stone of greenish gray colour, is quarried at Angel Island in the Bay of San Francisco, and a brown sandstone from Alameda County is largely used in the cemeteries as bases for monuments and for vault construction.

Slate, fit for roofing purposes, is rather limited in its development in comparison with other structural stones in the United States. But ninety-four quarries are worked, producing annually nearly half a million of squares, and of these the greatest number are to be found in Vermont and Pennsylvania. Of other kinds of rocks useful for building we may mention trap, worked pretty extensively in Connecticut, and trachyte, another igneous rock, very common in the western mining regions. It is usually of a pinkish grey colour, and is very soft when taken from the quarry, though it gradually indurates on exposure to the atmosphere.

Building materials, otherwise than rocks, are of importance almost beyond that of their

ntrinsic value, inasmuch as they employ so many hands in their preparation. For instance, the making of bricks, tiles, fire-bricks, and drain-pipes gives occupation to 70,000 hands, the annual value of the products being estimated at 34,000,000 dols. Most of the cement is made from natural rock, hydraulic limestone being more or less developed in the majority of the States. There are, however, certain localities which make a speciality of cement production. One of these is Rosendale, in New York State, the rocks of that neighbourhood, which are the bottom beds of the Lower Helderburg group, and the top beds of the Niagara group, containing from 17 to 22 per cent. of silica, 34 to 48 of lime, and about 10 of oxide of iron and alumina. The production in this centre is at the rate of 1,600,000 barrels per annum. Natural cement is also produced in Kentucky and Indiana, and is known as Louisville cement. The total yield of cement throughout the States is about 3½ million barrels, of which Portland cement only ranks at 85,000, the great bulk of this latter, as indeed of all the artificial cements, being imported. The barrel of natural cement, which weighs 300 lb., has an average value of 1 dol. 10 cents, while that of Portland (which is 400 lb.) is 2 dols. 25 cents at the works. All these three kinds, viz., Portland, Rosendale, and Louisville are generally used for work under water, and where great strength and tenacity are required, such as the foundations of heavy buildings, like sea-walls, sewers, light-houses, &c. But while admitting the excellence of the natural cements, there is no doubt but that the Portland, whether made in America or imported, is the most useful, and possesses a greater resistance to crushing than all other cements. The prices in the Western States and those of the Rocky Mountain districts vary greatly. In Denver (Colorado), where about 100 barrels of 400 lb. are turned out daily, the value of this local production is 6 dols. per barrel, that of Portland (375 lb. net) being 7 dols. to 7 dols. 50 cents, and that of Louisville (265 lb. net) being 4 dols. Both the importation of Portland cement and the local manufacture are on the increase, which is due, not only to the actual increase of building everywhere, but to the fact that cement is rapidly superseding lime mortar for ordinary purposes, and especially in large and expensive erections.

A common rock in America is that of steatite or soap-stone, which is used to a considerable extent as refractory linings for furnace hearths, grates, stoves, and foot-warmers, and also for stationary laundry tubs and sinks. It is principally quarried in the New England States, the production being at the rate of 6,000 tons per annum, and the average price at about 15 dols. per ton. *Apropos* of limestone and marble, it may be mentioned that some 25,000 tons are annually ground down and sold as marble dust at 7 dols. per ton. The employment of this material is in a truly American fashion, viz., for the generation of carbonic acid in soda-water fountains.

As far as the natural source of plaster of Paris is concerned, it might be produced to an unlimited extent, seeing that such vast beds of gypsum exist in the United States, extending in Texas alone for many hundreds of miles along the head-waters of the Red River. There are also beds of great thickness in New York, Virginia, Kansas, Ohio, Arkansas, and Michigan, those of the latter state belonging to the upper sub-carboniferous formation, the yield of which in 1882 was 701,450 net tons of plaster, and 1,109,810 barrels of stucco (of 300 lb. each). It is somewhat singular that, although New York State has such large deposits of gypsum, most of the plaster and stucco made on the Atlantic seaboard is from imported Nova Scotian stone. All through the Rocky Mountains and Pacific States, there are enormous beds of gypsum, and particularly in Nevada, Arizona, and New Mexico, though the lack of a market renders them practically valueless. In New Mexico it is mixed and made into plaster by the natives, who take it to Santa Fè, and sell it for 1 dol. per bushel. At Socorro, in the southern part of the Territory, gypsum is called "hasped" or "yeso," and is used as window-lights, and as plaster in white-washing the interiors of their adobe houses. There is a steady manufacture of plaster of Paris at San Francisco, where it sells as follows, per barrel:—hard, for finishing and general use, 2 dols. 75 cents; for casting ornaments and moulds, 3 dols.; superfine, for sculptors' use, 3 dols. 50 cents; while common plaster is ground on a large scale for fertilising purposes, and fetches about 12 dols. 50 cents per ton.

NOTES.

OUR Transatlantic cousins are going to carry the war into the enemy's country,—that kind of humane and humanising warfare in which both sides may be the gainers. They are projecting an American Exhibition in London, on a large scale, to be opened in May, 1886; a long date, which seems to imply that a great effort is to be made to represent the products and industries of the States in a manner worthy of the occasion. According to the circular issued by the secretary, General Norton, the Exhibition is receiving the hearty support of the Governors of States and the presidents of the principal railway companies; and the Exhibition "will be truly national in character, and will afford the opportunity to Europeans of seeing the American artisan at work, as we shall have a large building occupied by American workmen (white and coloured) engaged upon their respective handicrafts." Whether there can be anything very special in the *modus operandi* of the American artisan, "white or coloured," as distinct from that of the English artisan, we should question; but it has become rather the fashion lately for large exhibitions to include the spectacle of workers working at their crafts; the public have a fancy that they like to "see how it is done," though we imagine very few of them really learn anything in that way. But, apart from this, which is a matter of detail, the exhibition cannot fail to be of interest, and to contain much that is new to many of us. According to the *New York Herald*, America has never yet been well represented at any great European exhibition:—"At Amsterdam last year we were represented only by a few sewing-machines and parlour-organs," and it is promised that in this London exhibition we are to have a show of natural products such as will be entirely new to London or any other European capital; and with this we have no doubt we shall also see all that our friends over the water can show in the way of mechanical science and mechanical improvements. When we remember the comparatively recent date in the world's history of the settlement of "the Britisher" on the American continent, it is a remarkable spectacle to see the descendants of that small band, now become such a vast and energetic nation, proposing to come over to us and "report progress" on a grand scale. They may be sure of their welcome; and we will venture to predict that the exhibition, if well carried out, will be one of the most popular things of the kind that has ever been organised in London.

THE scheme for the New Public Offices, by whomsoever they be built, will involve the destruction of the houses in Spring-gardens. There are many of them veritable Queen Anne buildings, little as they may look like it to those who associate a method of design very remote from the simplicity and quiet of these houses with the name of that ill-used monarch. Much of the detail is distinctively English in character and of an exquisite refinement, and the interior finishings, especially the plaster and ironwork, will well repay the careful sketcher's pains. The old houses should not pass away without an accurate representation of their best features, and we trust that before the white figures of the auctioneer appear on their fronts some earnest admirer of a class of architectural detail which has much that is admirable about it will have made a faithful record thereof.

WE give in another part of the present number sections of a high-pressure water-meter designed by Mr. Pendred, whose scheme for a low-pressure meter we illustrated a short time since (page 591, *ante*). The subject comes somewhat *apropos* of the recent letter of Mr. Octavius Coope, the chairman of the East London Water Company (in the *Times* of the 24th), complaining strongly of the waste of water and the disinclination of their customers to adopt any means for avoiding or lessening waste. His company have, he says, from time to time made vigorous efforts to establish "constant service," but the result in four of their districts has been the consumption of water at the rate of forty gallons per head daily, certainly far more than is at all likely to have been used in real and legitimate needs by that portion of the population. The constantly increasing size of London and increasing value of water, and the difficulty of keeping pace with the demand, all seem to us to point to the compulsory adoption of a meter system sooner or later, as the only means of ensuring carefulness and absolutely fair charge for what is used. Nor do we believe that a meter system would any more lead to an insanitary parsimony in the use of water than it leads to any inconvenient restriction in the use of gas. The knowledge that gas is charged in proportion to the amount hardly leads any one to restrict the burning of it whilst it is actually in use; it leads people to turn down the gas when they are not using it, that is all: and similarly the establishment of a meter charge for water would lead people to see that their taps and water-closet supplies are not left running, not to spare the use of water; and it would, at the cost of some initial expense, put water charges on a simple and business footing once for all.

IN the rooms of the Royal Scottish Academy, Edinburgh, an exhibition of national portraiture is to be opened next month. The special object aimed at in bringing together such a collection is to awaken public interest on the subject of historical portraiture in view of the formation of a permanent National Portrait Gallery which is to be opened at no distant date. The exhibition is to consist of authentic portraits of Scotsmen, or persons intimately associated with the country, whether in politics, literature, science, or art. Such portraits need not of necessity be excellent as works of art; it will be sufficient if they are trustworthy and the subjects interesting. Promises of contributions have been received both from public bodies and private individuals, and it is confidently anticipated that the exhibition will prove a success.

MESSRS. BEATTIE & Co. have nearly completed the contract for erecting the building for the forthcoming International Forestry Exhibition at Edinburgh. The building occupies the spacious lawn in front of Donaldson's Hospital, at the west end of the city, and is appropriately constructed of wood, the roofs being covered with felt. The available space within has been fully taken up, and of this 15,000 ft. are allocated to Government collections; trade exhibits, 10,000 ft.; loan collections, 2,500 ft. To the west of the building there is an outside space of about seven acres in extent, which is to be appropriated for glass houses, pavilions, châlets, &c. The Exhibition building outwardly is unpretentious, the only attempt at producing effect being in the projecting roofs of the gables, and turned balusters at the divisions of the gable windows. The lighting during the day is mainly obtained from roof lights, and at night the electric light is to be brought into requisition.

THERE is to be a large and important Loan Exhibition of Paintings, by Old and Modern Masters, held at Brighton in the autumn, in connexion with a general Science and Art Exhibition in aid of the Brighton and Hove School of Science and Art. As the Town Council have granted the use of the Picture Gallery for this purpose, the usual annual exhibition of pictures at Brighton will not take place this year, but it is expected that it will be continued as usual in succeeding years.

THE donor of 10,000*l.* for the establishment of a Gallery of National Historical Portraits in Edinburgh has now come forward with an offer of 20,000*l.* for the purpose of building or acquiring premises for the accommodation both of the National Portrait Gallery and of the Museum of Antiquities. This offer has been made under the impression that the former gift has indirectly had the effect of prejudicing the Society of Antiquaries as custodiers of the Museum of Antiquaries. The first proposal was that the Society should vacate the premises at present held by them in the Royal Institution, and remove to new premises to be provided for them by Government. It was contemplated to accommodate the Society in a new wing to be added to the Museum of Science and Art, but this proposal was opposed by the authorities at South Kensington for various cogent reasons. An addition to the accommodation required by the Society is becoming of pressing necessity, and such would be provided in the new building along with the Portrait Gallery. Another advantage accruing from this arrangement would be that an important portion of the Royal Institution would be available for purposes of the School of Arts, the pupils of which are inconveniently crowded. A vacant site for the proposed new building, situated at the north-west angle of St. Andrew-street and Queen-street, is available, at a cost of 7,500*l.* It is conveniently situated, and would afford ample room for the new erection. The donor makes it a condition that the whole sum of 20,000*l.* shall be spent upon the building, and the Board of Manufacturers make an offer of 2,500*l.* towards the purchase of the site, and the Treasury are to be asked to give the remaining 5,000*l.*

THE outbreak of Cholera at Toulon appears to have turned out less formidable than was at first feared, and to be, by latest news, somewhat subsiding; but it is a warning, not to be neglected, of the possible approach of the enemy. The newspaper descriptions of the site of the outbreak are instructive. Toulon is a town with narrow and bad-smelling streets, and where the refuse is emptied into the gutters. After their fright the Toulonese will, perhaps, think of remedying these defects. The Mayor of the town appears to have acted with exemplary good sense and spirit in advising and aiding his townsfolk.

WE have received a circular or pamphlet, issued by Mr. Laurie, of Paternoster-row, and intended, apparently, to be addressed in turn to whatever Corporation may appear to have the opportunity of starting a Museum of Science, Art, Industrial Products, and Inventions, urging upon them the desirability of inaugurating such institutions for practical and technical instruction." "With the probable addition of two million voters to our electorate," says Mr. Laurie, "is it not incumbent on us to take active steps to raise the general intelligence of those who, for the first time, are to exercise the franchise?" The writer proceeds to make some general suggestions as to the manner in which such Museums should be arranged, each subject to be grouped within a limited space and illustrated with specimens, models, and diagrams, calculated to lead the eye and the mind from the contemplation of familiar objects to the principles which they embody, shown in such a manner as to be obvious even to those who have little "book-learning" to aid their perception. Mr. Laurie goes on to give some examples of the way in which some special subjects should be thus illustrated. His suggestions are very sensible and practical, and deserve the attention of those who are interested in this method of popular education.

ILLUSTRATED magazines and papers continue to increase, and there is now an announcement of *The Illustrated Naval and Military Magazine*, a new monthly periodical to make its appearance on the 1st of next month, "to be devoted to all subjects connected with Her Majesty's Sea and Land Forces," for which the services of Messrs. Linley Sambourne, R. Caton Woodville, W. H. Overend, Rudolf Blind, and others, are engaged for the illustrative department. That promises well for the pictorial side of the illustrations, but we would suggest that there are many topics connected with naval and military operations which need illustration of a more practical than pictorial kind, and we hope this side of the matter will not be lost sight of entirely, in favour of mere pictorial effect.

THERE seems to be some confusion and cross-purpose in regard to the claims of "the cyclists" for admission into the parks, and also in regard to the rights and reasons of the whole question. The cyclists, by their deputation to the First Commissioner, asked for admission to Regent's Park, Battersea Park, and Victoria Park, for purposes of "traffic," not of "exercise," and obtained their request; but a member of the National Cyclists Union writes since then to the papers to say that they limited their request to what they thought they could at present obtain, and that "it was only from fear of rebuff that all the parks, and especially Richmond Park, were not included in their request." It appears to us that it will be impossible practically to distinguish between "traffic" and "exercise," unless special constables on bicycles are kept to dog the wheels of the cyclist, and see that, having entered at one gate, he goes straight out at the opposite one: without this the restriction will practically be a dead letter. As to the sense of the exclusion of cyclists from parks, it seems to us only to apply with force to the case of Hyde Park, which is the fashionable drive, and is overcrowded in the season, without adding "cycles" to the total; and, moreover, bicycles are unquestionably awkward animals in a crowd, as they will not stand still or proceed at less than a certain minimum pace without losing their balance; being in this respect more unmanageable than the majority of riding-horses. But apart from the case of a crowd, cycles are hardly a danger in the neighbourhood of London now; horses have got pretty well used to them; and no one can pretend that they are unsightly; therefore we can see no reason why they should not be admitted into Richmond Park, when there is no crowded traffic. Hyde Park is an exceptional case; but with that exception it seems to us they may very well have the run of the parks, and no one be any the worse for it.

WE are to have, it appears, more of the Charing-cross Railway Bridge. A little of modern engineering architecture goes a long way in despoiling a river, and as no possible additions could well make Charing-cross Viaduct more hideous than it is at present, the addition is little more than a question of quantity,—so many more yards width of ugliness. The Metropolitan Board of Works are, however, to be commended by patriotic persons for the stand they made against the addition, and for the check they have procured against the absolute indifference of the South-Eastern Company as to anything which may spoil the Thames Embankment. At present the portions of the Embankment adjoining the viaduct are planned symmetrically on either side of it, so as to present an idea of fitness and pre-arrangement in the connexion of the Embankment and the viaduct. The Board of Works have, at all events, secured a provision that the Railway Company shall defray the cost of altering the Embankment so as to fit symmetrically with the new state of things when the addition to the Viaduct is made. We are obliged to be thankful for very small mercies nowadays, in regard to the spoiling of London sites by railway enterprise, and we are thankful accordingly for this one, and praise the Metropolitan Board of Works,—which we cannot always do.

The Royal Colonial Institute.—Messrs. Archibald Smith & Stevens, of Janus Works, Queen's-road, Battersea, have been intrusted with an order for one of "Stevens & Major's" patent suspended hydraulic passenger lifts for the Royal Colonial Institute, Northumberland-avenue.

SCULPTURE AT THE ROYAL ACADEMY.

As we before observed, sculpture at the Academy is stronger this year than usual, and some, at least, of its strength is in the right direction,—that of the embodiment of ideal and poetic subjects, either of history or legend, or of pure imagination. Of course there are not really many of such works, but speaking relatively, they are more numerous than usual, and may be regarded as forming a class by themselves to be considered separately. Mr. Birch's "Godiva" we have already spoken of when we published our illustration of it, and need only refer now to what we observed in regard to it then (p. 640, *ante*). Among the works of a purely ideal class, one of the finest and most original is the bronze figure in the Octagon, entitled "L'Age d'Airain" (1,667), by M. Rodin, whose fine study for a figure of John the Baptist was one of the few things worth looking at in the exhibition of the French "irreconcileable" artists at the Dudley Gallery last year. It is the nude figure of a thin, spare man, in an attitude as if almost too fatigued to stand, and with one hand placed wearily up to his head; the whole figure is most pathetically expressive of the stress and strain of labour, and its result on the human character. It would have been more realistically complete if the sculptor had shown the limbs somewhat distorted from their best proportion by the overstrain on certain muscles to the exclusion of others, which is the case with most men who are engaged in laborious and unchanging toil; but this would have been, perhaps, an error from a sculpturesque point of view. As it is, the work is a remarkably fine one, when once its intention is grasped; a matter, however, which we fear few of our ordinary Royal Academy visitors trouble themselves about; nor, indeed, do English sculptors often give them a problem of this sort to work out. The other ideal work in the Octagon, which may be grouped with this, is Mr. Onslow Ford's "Linus: the Personification of a Dirge of Lamentation" (1,680), a male figure walking along with face upturned and carrying an inverted torch. This, though less thoughtful and less strikingly original than the previously named work, is a fine and expressive figure, and a worthy contribution to the short list of works, fulfilling what we take to be the real, or at least, the highest objects of sculpture. Among other works of similar class may be named Mr. Swinnerton's "The Victor" (1,676), a figure of a man with a sword in his hand gazing rather (as it seems to us) contemptuously on the wreath which he holds in the other hand, as if he were appraising it in the business way in which Swift summed up the expenses of a Roman triumph, —"a crown of laurel: 2d." The figure is not remarkable in any way. Mr. Milo Griffith's "Slinger" (1,671) is another male figure very carefully modelled and with much realistic detail of muscle, but the chest seems formed on the lines of Greek conventionalism, while all the rest is realistic: the figure is only partially a success, it wants animation, and does not seem in earnest; the slinger handles his materials very gingerly, and as if not quite sure if he could make up his mind to use them. Mr. Pinker's "Britannia" (1,669), backed by a lion very large at one end and very small at the other, is a somewhat stiffly posed and heavy lady, and does not succeed in exalting our ideas of Britannia.

Facing the main entrance, on the opposite side of the octagon, is Mr. Mullins's terra-cotta group of Isaac and Esau, "Bless me, even me also, O my father" (1,682); the most important work Mr. Mullins has produced, and occupying a more central and leading position than he has before occupied in the Academy exhibitions. The group deserves its place. It is, for one thing, exceedingly well composed; the figure of Isaac, half raising himself in a sitting posture, is met by the half-crouching suppliant figure of Esau; the lines of the two figures blend into one mass, sloping away towards the feet of the two figures in a manner that appears natural, though evidently carefully studied; the pose and expression of the aged patriarch are very dignified and pathetic; the character of the hands has been carefully studied. We shall give an illustration of this work shortly. Among other things to be mentioned in the octagon-room is Herr Schoojan's life-sized group, "Rescued from the Deep" (1,694), which has great merits of composition and modelling, but wants the power of realisation; the

man, who is supposed to be dragging up a mother and her child from the sea, is not really exerting himself, and is in an attitude more favourable to the production of graceful lines than to the exertion of muscular force; the woman rescued does not seem to have suffered much, and is in a stage attitude very different from what we might expect in a figure dragged up, half-drowned and terrified, from a watery grave. In short, this is a stage group, with merits which lie on the surface only. Signor Lucchesi's figure of "A Waif" (1,681), a poor little vagabond boy, is very pathetic and expressive in the thin, worn, and wistful face; the rest of the figure seems hardly in proportion with the head, and the hands are not those of a "waif." The two colossal portrait statues, Mr. Bruce Joy's "Lord Frederick Cavendish" and Mr. Brock's "Sir Richard Temple," lose, as all such works must, from their confined position; both have strongly-marked personal character, of a sufficiently opposite description. Mr. Adams-Acton's bust of Cardinal Manning (1,689) is a fine one, and Mr. Bruce Joy's "Mr. Gladstone" and "Miss Mary Anderson" (1,691-2) are admirable likenesses. Mr. Amendola's "Rose among the Roses," a head and bust of a female figure rising from a mass of roses (unsuitable things to carve in marble) cannot be passed over, but its cleverness is not of a high order; the head is a poor and sensual one; there is a flavour of vulgarity about the work. Mr. Armstead's pretty and fanciful little figure entitled "Egypt" (1,688) should not be overlooked.

In the Lecture-room Mr. Alfred Gilbert's small figure "Icarus" (1855) attracts the notice of all who can appreciate delicate fancy, and originality in pose and conception. The "Icarus" is an elegant but weak youth, and seems already to feel the wings too much for him; the sculptor has very cleverly endeavoured to give some degree of mechanical possibility to the method of attracting and using the wings. The figure is, it must be admitted, a kind of reproduction of the sculpture of the Renaissance, in feeling and manner, though not of any special work. Mr. Gilbert's head of an old man in bronze (1,699), is a clever but disagreeable piece of realism. Mr. Woolner's alto-relief, The Water Lily" (1,700), is a charming little work, which we illustrated a few weeks since. Among the ideal bronze heads which are becoming, we are glad to say, rather a fashion,—it is a fashion quite on the right lines of sculptor's work,—is an interesting and expressive one by Mr. G. W. Kinloch, entitled "After Labour, Rest" (1,748). A more powerful and very imaginative head in relief, in bronze, is Mr. H. Bates's "Orpheus" (1,804), which should not be passed over. Among the larger works Mr. Thornycroft's "Mower," which we illustrate in this number, is a fine example of treatment of a subject of everyday life in sculpture. The attitude is admirably easy and natural. Whether it is a subject to be treated in sculpture on that scale is another question. As a study in plaster or terra-cotta such a work is a highly interesting experiment, but would there not be a sense of unfitness if it were translated into marble? We are disposed to think so. It is a subject rather for treatment on a small scale, as a sculptor's sketch: on a large scale it hardly seems worthy of the dignity of the art, though its expressive character and unaffected simplicity have secured it, and deservedly, much admiration. Mr. Lawson's "Retiarius" we have already illustrated and commented upon. Mr. Calder Marshall's "Psyche," a recumbent figure supposed to have fainted, is finely modelled, but not very original; one can hardly accept it as an ideal of Psyche. The same sculptor's "Youth" we have already mentioned. The Lecture-room contains three Academy school designs for the subject of Socrates teaching or arguing in the Agora, by Messrs. H. Bates, H. A. Pegram, and G. J. Frampton respectively (1,712, 1,738, 1,799), of which the first in order of hanging is certainly the best; one or two of the figures seem rather closely adapted from Flaxman, than whom, however, there could not be a finer or more wholesome model for young sculptors. The fourth place on the wall, corresponding to those occupied by these works, is filled by a design in relief by Mr. Adams-Acton, a portrait group of boys, with rabbits, rabbit-hutch, and all complete, which we see with pain. Is it intended to carry out this in marble? Anything more decidedly unsculpturesque could hardly be.

Among the bust-portraits is an admirable likeness of Mr. Herbert Spencer, by Mr. Boehm (1,784), and the model of Mr. Brock's massive-looking bust of Longfellow now in the Abbey. Mr. Boehm exhibits also a very successful bust of Lord Wolseley (1,722), and Mr. Belt one of Lord Shaftesbury (1,708), of which we will only say that it is a pointed comment on recent events: it certainly has not been "invested with artistic merit." Mr. Fry's bust of Mr. Norman Shaw (1,727) is a good one, so is Mr. Pinker's Professor Rolleston (1,730), notable for the bold way in which the marble is treated, with the tool-marks almost visible on it, and no "effete" fining down. Mr. Birch's Mr. Wilson Barrett (1,773) may be noted, as also Count Gleichen's pretty and refined portrait of a lady (1785), a bust rising from between two wings. Among the smaller works, a design for a salver, in low relief, by Mr. Mark Rogers, jun. (1843), is very good. Miss Alice Chaplin's "Kassasseen" (1739), an equestrian group, is full of spirit, so is her "Bird in the Hand" (1,829), in the claw, rather, of a cat; and Miss Hannah Barlow's "Orpheus" (1,812), a group of lambs, and her little relief subject, "The Sick Lamb" (1,828), are instinct with truth and life.

Further examination of the sculpture bears out what we have implied before, that it is the most successful and interesting portion of this year's exhibition; and it is a good many years since that could be said.

THE THROTTLE-VALVE OF THE MERSEY.

THE opinions of Sir W. Forwood (p. 871, *ante*), as to the advantage of the constant changes now effected, at each spring tide, in the channel through the sandy estuary of the Mersey, should be compared with the valuable paper "On the Changes in the Tidal Portion of the River Mersey and in its Estuary," by J. N. Shoolbred, M.Inst. C.E., which, together with a report on the discussion of the same, is to be found in vol. xlvi. of the Proceedings of the Institution of Civil Engineers, illustrated by five plates, giving charts, sections, and tidal lines of the river. Papers abstracted from foreign periodicals "On the Currents in Navigable Rivers," on the Cavour Canal, and on floods on the Danube, the Theiss, the Durance, and the Seine, are contained in the same volume; as well as a paper by Mr. W. H. Wheeler, M.Inst. C.E., "On Fascine Work at the Outfall of the Fen Rivers, and Reclamation of the Foreshore," and a report of the discussion on the subject. Admiral George Evans, at that date (1876) Acting Conservator of the River Mersey, and several members of the Institution, of large experience in hydraulic works, took part in the debates; and the changes in the channel from 1820 to 1871 were shown on the drawings, and numerically stated, in cubic yards, in accompanying tables. The theory advanced by Sir W. Forwood to the effect that what he calls the "wriggling about of the channel" of the Mersey above Garston "prevents accretion," and maintains the tidal capacity of the channel, found no advocate at this council of experts. On the contrary, Mr. Brooks said that "engineers should not be thwarted in their efforts to improve rivers by the crude theories of those who, without practical knowledge, forbade all interference with them, and laid down laws in regard to river improvement and conservation. The cause," he said, "of the present bad condition of the river was the state of the inner part of the navigation, there being a mass of shoals above the pool, instead of a properly confined channel. When river works were carried out judiciously, there was a much more powerful tidal column running up the river, and there was no such obstruction as that now existing on the bar. Notwithstanding the large volume of water from the backwater of the Mersey and its tributaries, due to the drainage of the country, the harbour was inferior to that of the Dart, in that the latter had eight fathoms depth of water at its mouth at Dartmouth, and it was even inferior to the little river Medina between East and West Cowes, where the depth of water on the bar was 11 ft. at low water of spring tides."

As at the date of the discussion in question there was no idea entertained of an improved water communication between Liverpool and Manchester, the general accord of the speakers has much greater weight than almost any statements that may now be made on the subject, inasmuch as it is free from any charge of either conscious or unconscious advocacy. A Bill was at that time in Parliament for the appointment of a Commission to represent the various interests connected with the navigation of the Mersey. It is noteworthy that Mr. Leader Williams, then, we believe, engineer to the Bridgewater Canal, said that "the large middle portion of the Mersey, when the river widened out to a great extent, was in such a state that it was impossible to expect a good navigation. By confining the ebb and flow of the tide always in one direction the same results might be expected as had followed in the case of other rivers." Mr. Giles said "there were many examples of rivers having been regulated and narrowed by banks nearly parallel, that had increased the flow and thereby deepened the channel." Mr. Redman showed that the volume of water passing Liverpool was somewhat less than the volume of the Thames above Sheerness, and that while in that river the difference of high-water level between Sheerness and London Bridge, a distance of forty-three miles, was 3 ft. 8 in.; the difference between Liverpool and Runcorn, a distance of twenty-five miles, was 4 ft. The beneficial results which had followed the training of the Ouse, the Nene, and the Witham, by fascine banks, were mentioned by Mr. Wheeler, Mr. Brooks, and Sir John Coode; and, in a word, the general *consensus* of professional opinion was wholly opposed to the theory now ventured by Sir W. Forwood.

The promoters of the Ship Canal were advised, in 1882, that no design would be complete which did not secure a deep-water channel through the estuary to the five-fathom line to the north-west of Formby Point; and that the question of giving stability to the edge of the Great Burbo bank, by kidwork or training, was a part of the general problem. Had this advice been followed the great cost of the unsuccessful Parliamentary application of 1883 would have been avoided, and even the present condition of the promoters of the Canal might have been materially improved. If the statement of our correspondent that the bar of the Mersey has shoaled 4 ft. in seventeen years be accurate, it is evident that, whether freely or reluctantly, the advice above cited must ultimately be followed, and that in the interest not of the upper Mersey ports alone, but also of Liverpool itself.

DETAILS OF TOMB OF FILIPPO DECIO.

THIS is the sheet of details, to larger scale, from Mr. Oakeshott's drawings of this fine monument, which, as we mentioned last week, gained for their author the Travelling Studentship of the Architectural Association. A peculiarity of the foliage in the upper portion is the number of little black dots of shadow caused by the small but deep circular cuts in the inner angles of the leaf-lobes, and even, in places, drilled through the leaves themselves. This is more apparent in the actual work than in the drawing here given, which, however, is otherwise a most faithful representation.

SCULPTURE AT THE ROYAL ACADEMY.

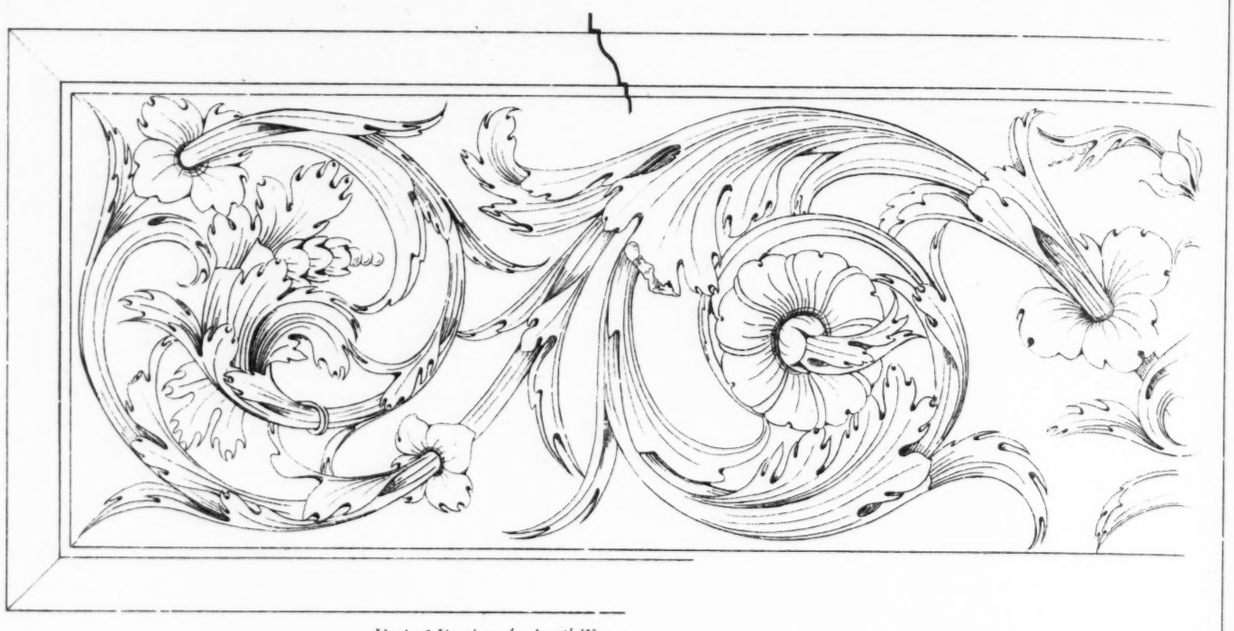
NO. 6.—"THE MOWER."

BY MR. HAMO THORNYCROFT, A.R.A.

WE have referred, in some general remarks on the sculpture of the year, in another column, to this fine example of the treatment of a subject from everyday life in sculpture. The figure stands conspicuously in the lecture-room as a kind of pendant or parallel to Mr. Lawson's "Retiarius."

HOUSE, LYNDHURST.

THE very picturesque-looking house of which we give a view was built for Mr. Maxwell as a hunting-lodge, from the designs of Mr. F. S. Brewer, architect, of Richmond. It exhibits great variety of outline, and a certain degree of rustic character just sufficient to assimilate it to its position and surroundings, without sinking the character of a gentleman's house. The proprietor, we understand, is as well satisfied with the practical arrangements and comfort of the house, and its adaptation to its purpose, as with its pictorial effect. It may interest some readers to know that the lady of the house is the brilliant authoress whose maiden name, Miss Braddon, is so well known on the title-pages of many a popular and successful novel.

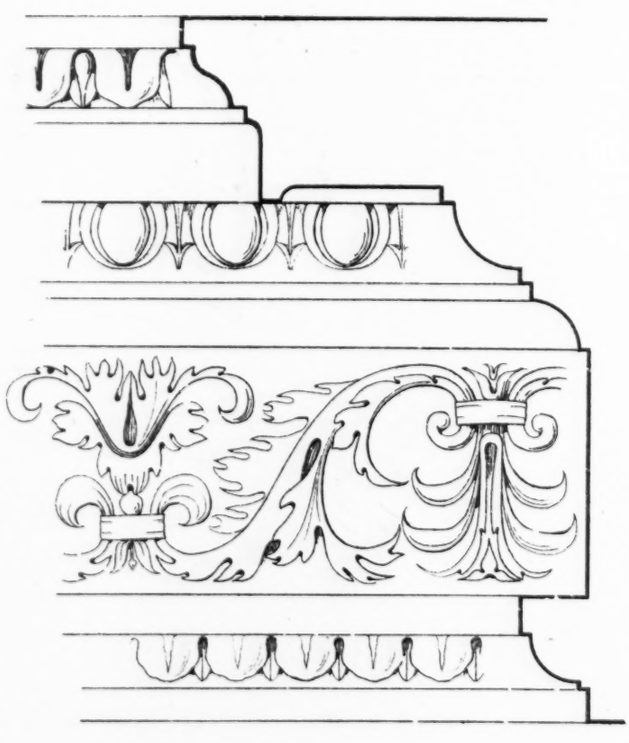


Part of Panel on level with Trusses

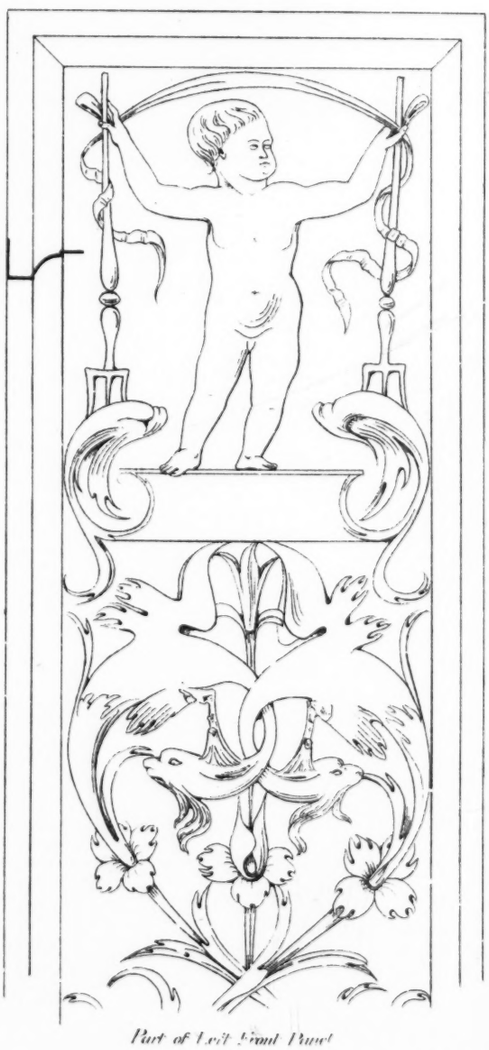
CAMPO SANTO PISA

Tomb of Filippo Decio — Details

(For General Drawing, see last Week's Number.)



Cornice



Part of Left Front Panel

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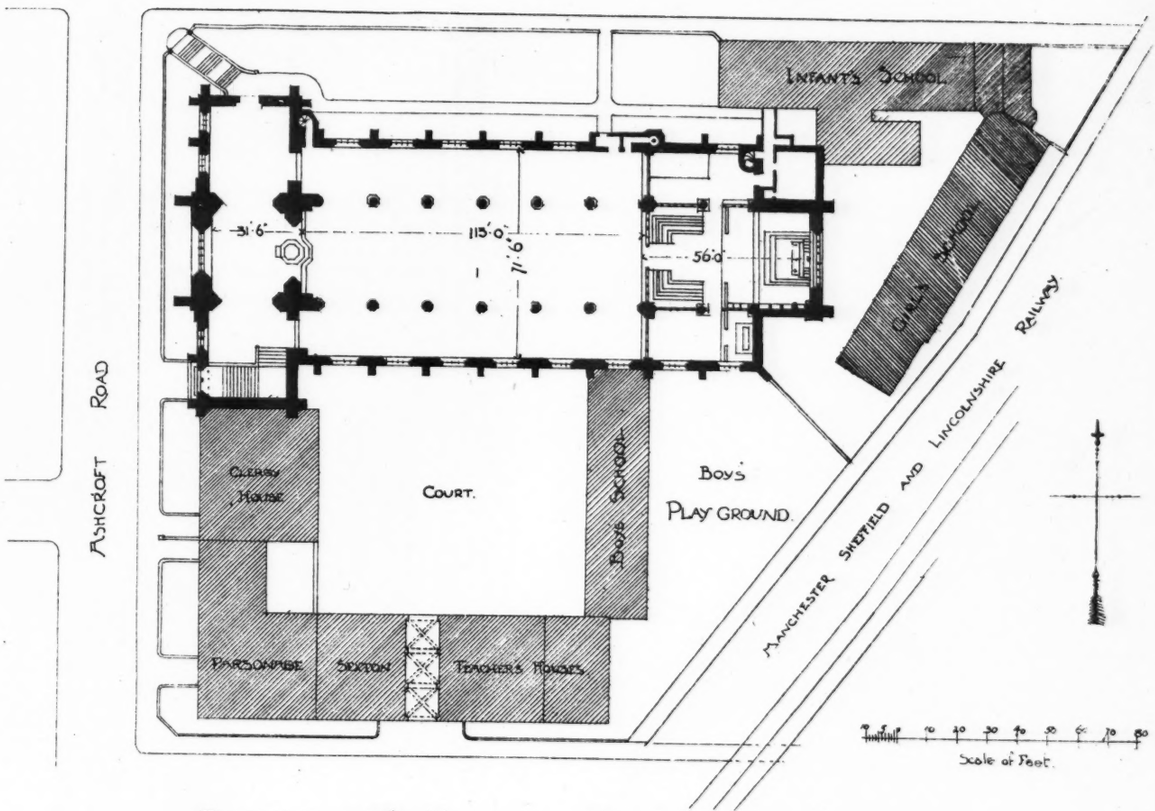
SCULPTURE AT THE ROYAL ACADEMY.

No. 6.—"THE MOWER."

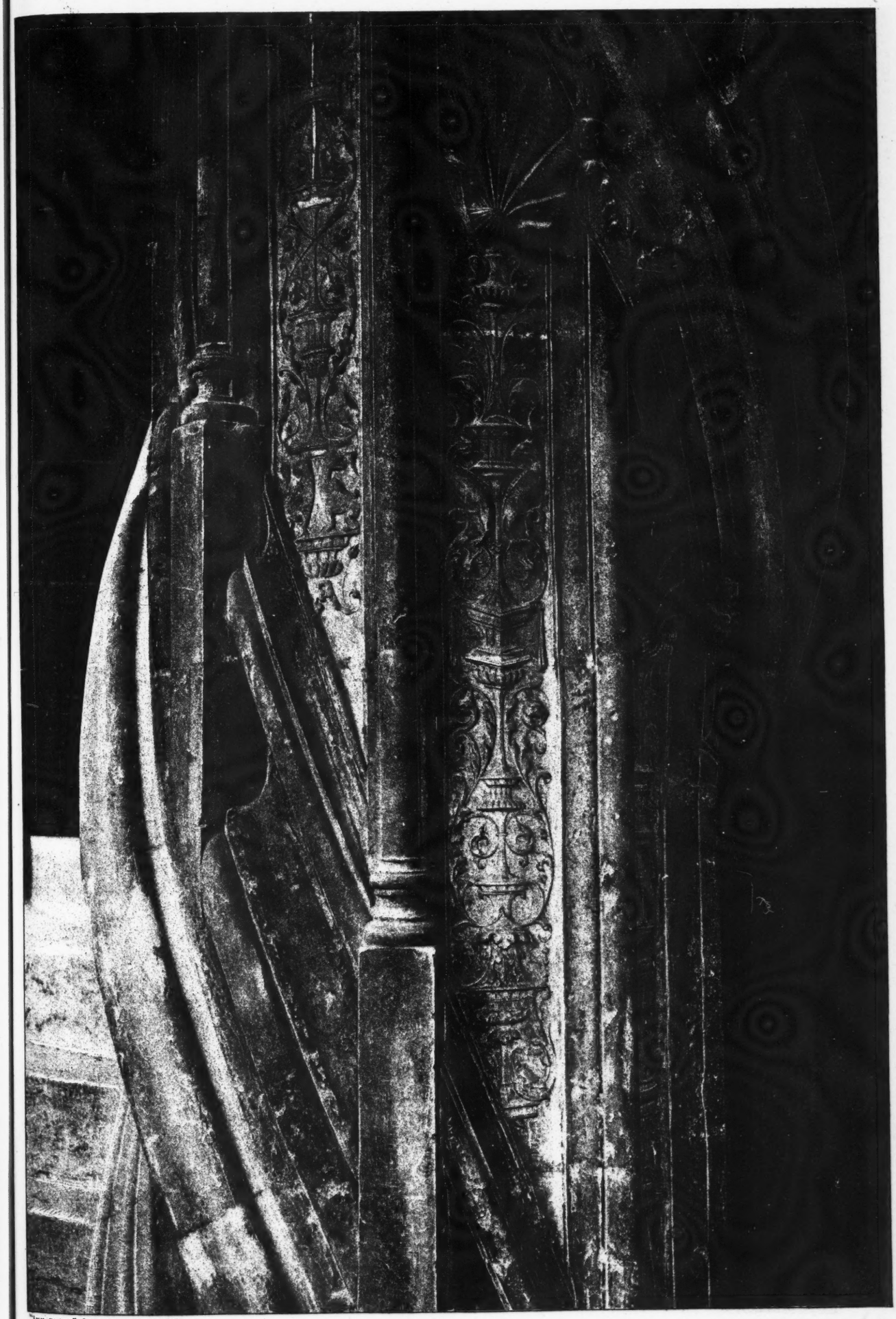
By Mr. Wm. Hamo Thornycroft, A.R.A.

C. F. Kell, Photo-Lith. & Printer



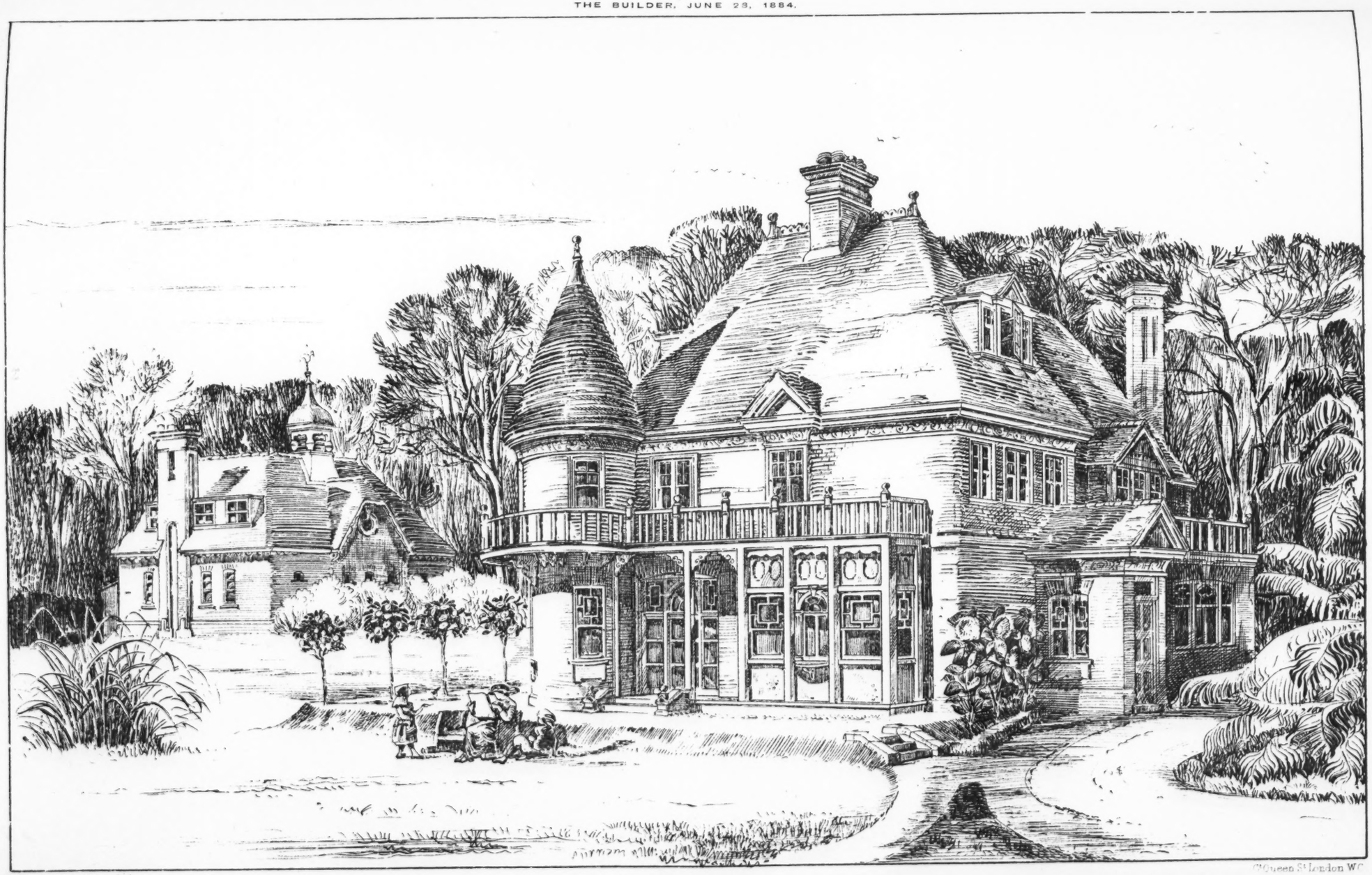
CHURCH OF ST. JOHN THE DIVINE. GAINSBOROUGH.

Mr Somers Clarke Junr
and Mr J.T. Micklethwaite } Architects
15 Dean's Yard Westminster.



INK-PHOTO. SPRAGUE & Cº, LONDON.

NEWEL OF THE GRAND STAIRCASE, CHATEAU DE BLOIS.



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HOUSE, LYNDHURST: FOR MR. MAXWELL.—MR. F. S. BREWER, ARCHITECT

CHURCH OF ST. JOHN THE DIVINE, GAINSBOROUGH.

THIS church was begun in the year 1881, to provide for the rapid increase of population in the town of Gainsborough, the chief business of which is concentrated in the production of agricultural implements at the works of Messrs. Marshall & Co.

The portion of the building already constructed consists of the sanctuary, chancel, and three bays of the nave, the whole carried up to the level of the internal string under the clearstory windows, 33 ft. 9 in. from the nave floor. A hollow brick wall has been built against the outside faces of the octagonal columns, each bay pierced with a group of three lancets, and the building as now used forms an aisled church, showing the main columns and arcades of the finished work on the inside.

The site slopes towards the west; the floor of the nave is, at this end, 10 ft. above the street level.

The walls are constructed of red brick, with dressings, &c., of Ancaster stone. The interior intermediate surfaces are all plastered.

The chancel floor is paved with a chequer of Ancaster stone and slate.

A small organ of ten stops, by Lewis, is erected in a temporary transeptal building projecting from the eastern arch of the chancel on the south side. The temporary vestries are below.

Mr. Wm. Johnson, of Doncaster, was the builder of the church as yet erected. The architects are Mr. Somers Clark and Mr. J. T. Micklethwaite, of 15, Dean's-yard, Westminster.

NEWEL OF GRAND STAIRCASE, CHÂTEAU DE BLOIS.

WE give the view of this well-known and remarkably effective piece of Early French Renaissance detail, partly as a comment on the mention of the visit of the members of the French Congress of Architects to Blois (see in another column), partly for its own sake and inasmuch as a thing of beauty is a joy for ever. It is a remarkable example of the union of what is essentially, in some respects, Gothic feeling, with some of the more graceful and chaste detail of Early Renaissance.

MR. DU MAURIER'S DRAWINGS.

THE great public which Mr. Du Maurier delights would be hard set to give reasons for the faith that is in them. "His women are all alike," "his crowded drawing-rooms are always the same," "his jokes are so *very* long," are remarks we have heard again and again. If we examine this matter at all closely we find, of course, that his women and his drawing-rooms are not always the same, and that his "jokes,"—though, in fact, he is seldom jocose and never witty,—are often short and full of point. Two sufficient reasons for his popularity can be found: he is a keen and very careful satirist; and, secondly, an excellent draughtsman. The English people have a pure fondness for satire, as such, which is disheartening to those who desire their improvement; and they delight in reality. We are not educated to a Gallic appreciation of the "values" as distinguished from the facts of nature. Something we have seen once, and want to see again, is the most we demand of the painter. When the critic of the future shall have made a final analysis of æsthetic pleasure, we shall find that the mere faculty of recognition is at the root of it all, and that the simple delighted expression, "That's our Jim!" has in it the essence of all pleasure in art from that of the modest peasant to that of a Maudle or a Postlethwaite. Du Maurier satisfies to the full this English craving for reality. He has no exuberant humour to urge caricature; he is not driven into it, as many are, to conceal the weakness of his drawing. His subjects are straight from the life, and it is remarkable how many are the types of mind he has probed, of body he has portrayed with a wonderful fidelity. Like Homer, John Tenniel, Mr. Millais, and some more, Du Maurier may be caught nodding at his work. Sometimes, it must be confessed, his group seems very tame, and his joke too long for human endurance; but these slight lapses must not be grudged to a man who, for twenty-four years, has been *Punch's* most constant contributor.

Mr. Henry James, in the interesting essay which he has prefixed to the catalogue, shows himself an ardent and very discriminating admirer. The body of the catalogue has an interest which is lacking in general to such compilations, it being, in fact, a complete collection of those letterpress illustrations which properly belong to the drawings, and which already we have read in our *Punch*. There the imbecilities of Maudle are all enshrined; and the "things one would rather not have said" are collected by way of warning. To speak of these drawings in detail is hardly possible. They are upon a scale larger than that on which they appear in *Punch*, and they appear to us to exhibit very great variety in point of quality. Often, and this is the case particularly with his women, there is a charm of touch about the hair, eyelids, and lips which is lost in the engraving. In *Punch* we are apt to become ungrateful, and to be tired of these graceful women who seem always the same. Of the women of Du Maurier's own drawing it is hard to tire. No more beautiful example of his work could be shown than in the head of the American girl of 227. And no more sharply-pointed rejoinder than hers could be easily found. *Snobley:* "Aw—aw—it must be very unpleasant for you Americans to be governed by People—aw—whom you wouldn't ask to dinner!" *American Belle:* "Well—not more so, perhaps, than for you in England to be governed by People who wouldn't ask *you* to dinner!" The list of characters which Du Maurier can conjure up to the vision at will is a very long one. Every *nuance* in the gradations of English society he can unmistakably express. He knows and can draw the social difference between Bayswater and Kensington; the difference between a puppy and a snob, and between a cad and these two. None ever drew better the genuine English aristocratic. With the clergy he is not less at home. His studies of Frenchmen (as of French on the British tongue) are ever delightful. There is one ground upon which his drawings are occasionally displeasing to us. Mr. Du Maurier has a special sense of beauty, which is shown as well in the composition of his drawings as in the actual grace of his physical types. He has also a very special perception of ugliness, and in the portrayal of it, when, as we have said, he is napping, and his humour is not at its best, the sheer physical ugliness is sometimes obtruded in a manner which is distressing and offensive, because we cannot find its presence to be essential to the exhibition of any moral idea. That he is nearly infallibly true to nature we admit, but it does not affect our charge. The satirist, no less than the graver artist, must always be prepared to justify the selection which he makes from the unselected profusion of Nature. Unredeemed physical ugliness cannot, in itself, be any subject for satire; it is certainly no subject for art. It is pleasant to think that one of our favourite makers of fun can be also a very serious artist at will, and be the possessor, moreover, of a literary faculty which might be envied by many. "Der Tod als Freund," which appeared in the *New Illustrated*, is a pathetic and noble design, and the verses "from the French" which accompany it, would do credit to any translator.

RECENT ARCHITECTURAL PROGRESS AT VIENNA.

WE mentioned last week the paper read on this subject at the Congress of French architects, by M. Paul Sedille; we give now the following remarks extracted from it, with the author's permission:—

"It is in the new streets that we can study to most advantage the great recent architectural effort of Vienna. With that object, we must traverse the extensive districts which border the 'Ring.' Cut up with roads parallel and at right angles to each other, they have offered to the architects sites of a symmetrical and regular shape which contribute singularly to the monumental effect of these islands of constructions. To add to the effect of the *ensemble*, the building owners, individuals, or companies, have not unfrequently combined various estates in one sole construction, combining within its lines various courts and separate dwellings; it is, therefore, not uncommon to see façades presenting ranks of nearly thirty widely-spaced windows.

The permitted height being something over 24 mètres (13 klafters in Viennese measure) to the upper line of the main cornice, without counting the attics, roof pavilions, or other decorative features surmounting the cornice, one can imagine the size of the architectural masses that are produced. Nevertheless, these vast surfaces of building are enlivened by plenty of bold projections. The maximum limit for projection is 1·26 mètre, and in order to form a porch or *avant-corps* on to public land, it is only necessary to pay the rent of the space occupied. Thus, then, while at Paris the maximum projection for balconies is ·80 mètres, and that for cornices ·50, with uniform limits of height enclosed within a rigidly circumscribing line, at Vienna the architect can use considerable projections, and give life to his façades by advanced masses, detached columns, large balconies, or small chambers corbelled out; and further, above his cornice limit of 24·70 mètres, he can *silhouette* his façades by pavilions raised upon them, pediments and accentuated gables, turrets, cupolas, roofs of all kinds with no special limit imposed beyond the block of the main edifice, and thus contribute to the beauty of his own building and the interest and variety of the street architecture in general; the only restriction being that rooms for ordinary habitation are not to be built above the line of 24·70 mètres.

The building regulations themselves conduce to the maintenance of a large and monumental style of building. Only five stories may be built within the above-mentioned limits of height; and as every window must have a certain height above the floor, the floors themselves being very thick, being formed according to Vienna usage of heavy timber beams, a considerable height between each tier of windows is a necessary result, leaving a space very suitable for decoration.

The ground story partakes of the generally massive character of the buildings. The upper portions of the buildings do not seem, as in Paris and London, to be hung in the air above a void, where even the meagre support afforded by iron columns is disguised as much as possible. At Vienna the tradesmen seem to accommodate themselves very well to the subdivision of their windows by the piers corresponding to the architectural divisions above. Nor do they indulge in the vanity of windows down to the pavement, cutting all the visible basement in every direction. This fashion may come in, perhaps, judging from one or two attempts in that direction in certain very commercial quarters of the town; but, at all events, the properties in the vicinity of the Ring-strasse have escaped that barbarism and stand firmly on their piers.

Such is the general character of the exteriors of the buildings we are speaking of: a lofty ground-story forming a solid base to the whole, and accentuated by projecting masses, often disposed arcade fashion and marking plainly the point of support of the building. Above, four stages, an entresol, then a lofty and richly treated story, then another intermediate one, and a *quatrième* treated somewhat as an attic or dwarf story, and grouping with the cornice design which crowns the main building. The winter climate being severe at Vienna (which explains the use of double casements everywhere) openings are not needlessly multiplied in the façades, in which the solids surpass the extent of the voids, contrary to the custom in our overlighted houses, where we boil in summer and freeze in winter.

The Viennese house, then, offers naturally a great surface for the decorator. The architect profits by this. The monumental-looking portals with double columns and sculptures and rich cornices; the columned windows, with caryatides and pediments, the other stages adorned with friezes and decorations of all kinds, often with paintings on a gold ground; the balconies carried by columns or winged figures; the entablatures with many consoles and crowned with balustrades and statues, are the usual *motifs* of that architecture. Add to these the square or circular angle pavilions dominating the lateral wings, and above all the overhanging chambers (*loges en saillie*) on the façades,—which, isolated or superposed in stories, are at once a great interior convenience, and a source of charming exterior effect,—and you will have some idea of the appearance of these vast habitations, suggesting reminiscences of the Italian palaces of the Renaissance, which, on a first view, strike the visitor with astonishment. He asks with

reason how such decorative profusion has been possible in a pecuniary point of view, and if the individuals or companies who own these buildings have not the usual eye to the interests of the pocket. Well! one must in the first instance render that justice to the building owners and builders to say that, animated by a very honourable sentiment of patriotism, and further stimulated by competitition in their efforts, they have endeavoured to act on a grand scale, and to do their part towards the embellishment of that new city, of which every Viennese has a right to be proud. But there is another side, a reverse to the medal, a weak side of all this outward beauty. Let us explain.

Free-stone, hard or soft, sandstone, granite, marble, are materials very costly in Vienna. Nevertheless, these materials are existent not many leagues from Vienna, in the spurs of the Alps, or further in the mountains of Tyrol; but the quarries are for the most part monopolised by wealthy companies, who keep up forced prices. On the other hand, at the very gates of the city, there are immense banks of clay which furnish, after burning, excellent materials at little cost. Hence the employment at Vienna, from time immemorial, of bricks and tiles for the construction and roofing of both public and private buildings. It follows that there is still the most habitual and economical construction at Vienna. Stone and other durable materials are only employed exceptionally, in small quantities, by necessity, or as luxuries. Thus, then, all those vast constructions which affect the air of being palaces, are only in reality brick covered with cement. It is cement which forms every member of the architecture; and all the figures so often repeated are no more than mere *moulages* in terra-cotta joined to the brick base. Thence comes this lavish use or abuse of decoration. Thence the colonnades, atlantes, caryatides, figures of children in long file, produced and repeated till they almost weary the eye, and lose much of their value. Those far-projecting cornices and massive consoles are often only thin stamped zinc covering the nakedness of the beams which form the construction. The decorative paintings on a gold ground, before referred to, fade in a few years, as much as the reliefs in cement, under a climate little favourable to their duration.

We are at this moment too much the partisans of truthful architecture, of that which accentuates the materials which it employs, and which derives from the character of those materials its best expression, not to deplore these deceitful charms which, after examination, lose their effect. Architecture is not the decoration of a day made for momentary pomp and parade. One must have the assurance, in contemplating it, that this effect is durable, and, above all, that the forms and the decoration are the consequence of the characteristics of the various materials, and are not other than what they seem. There is nothing of the kind here. There are not the materials which imply this decoration, it does not appear to me indissolubly bound to the edifice, and, therefore, it interests me only as a kind of chimera, a piece of flattery of the eye decoration which I can in a moment modify by my own will, or suppress altogether.

Why have not the builders of these ambitious habitations made it their business to construct frankly in obvious brick, reserving the scarce and costly stone for certain necessary points in the construction, or for special *motifs* of decoration, when they would have had the more value the less they were multiplied? Great buildings would not in that way have lost their monumental aspect. On the contrary, they would have gained by this sobriety and amplitude and style, which they lose now through the abuse of an ornamentation vulgarised by constant repetition.

Another reproach against these handsome houses is that, behind their rich decoration, there is very little. Plan hardly exists. There are none of those niceties of distribution which render life so easy and comfortable in our Parisian interiors. Little care is given to accessory details. The apartment house is a *suite* delivered over, bare of everything, to the tenant; it is for him to make an interior of it according to his fashions and his tastes."

The Exeter Town Council have decided to place the work of renovation of the ancient paintings in their venerable Guildhall into the hands of Messrs. Haines & Sons, of 25, Fulham-road, S.W.

A HIGH-PRESSURE WATER-METER.

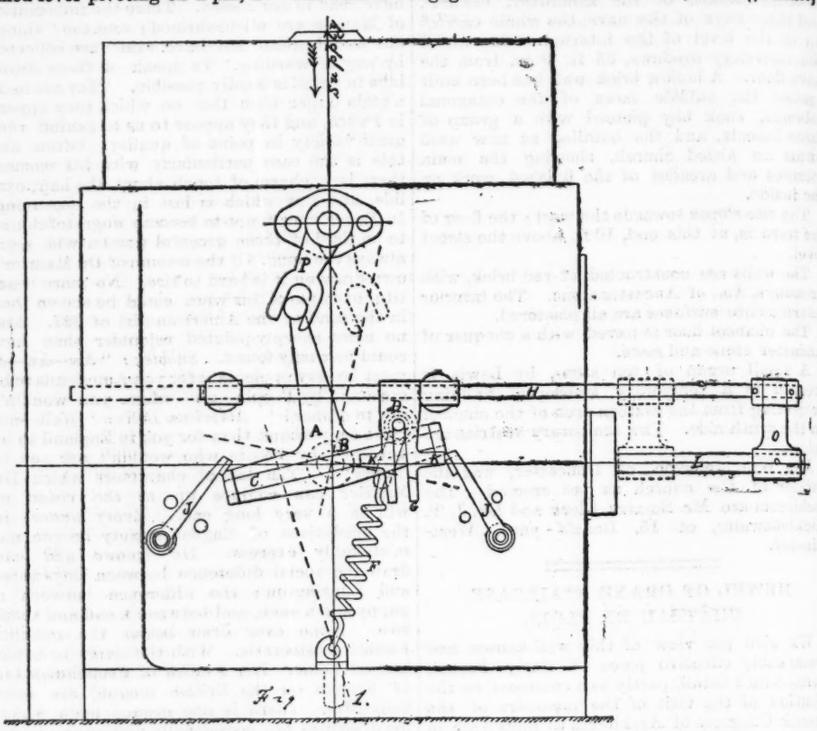
H. W. PENDRED'S PATENT.

THIS meter consists of a cylinder and piston, and is provided with a slide valve to direct the flow of the water alternately to either side of the piston; the valve may be balanced if necessary, to prevent any friction that might arise from pressure upon it.

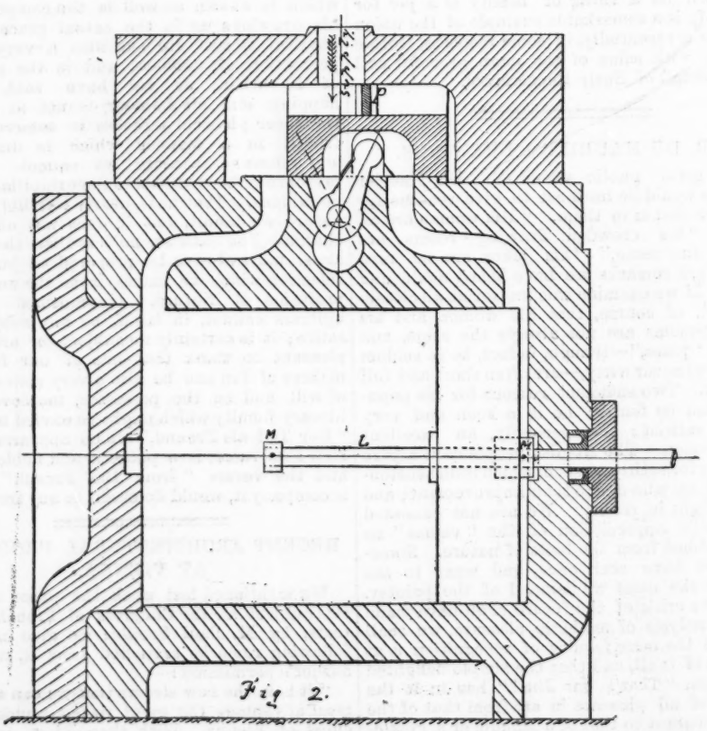
Referring to the drawings:—A is a three-armed lever pivoting on a pin, B. The ends of the horizontal arms are bent, as shown on plan (fig. 4), and a rod, C, is secured in them. On this rod is mounted a grooved roller, D, which is embraced by a bridle, E. The bridle is attached to a helical spring, F, which is united at its other end to the holding-down flange of the cylinder, as shown in fig. 1. The roller and bridle can be run to and fro on the rod, C, the spring swinging with it.

The bridle is embraced by a fork, G, mounted on a rod, H. At either end of the lever a tumbler or detent, J, is placed, pivoting as shown on fig. 1, and guarded by check pins. Each detent has a projection on its side, and the fork, G, has also two projections on it, K K.

A tappet rod, L, passes through a stuffing-box in cylinder end, and also through one in piston. It has two collars, M M, on it. Its end, outside cylinder, is joined to a rod, H, by a cross arm, O (fig. 3). The vertical part of the lever, A, is provided with a pin, as shown at fig. 3, which engages in forked end of O or P, on weigh shaft, as shown at fig. 3. This shaft has an arm which engages in slide valve, as shown.



Side Elevation.



Longitudinal Section.

By another arrangement of the tappet gear the rod, L, is fixed to the piston, and passes through cover as before. The horizontal part of A is made longer also. By this arrangement the stuffing-box in piston is done away with, but, as will be seen, the meter takes up more room.

Action of Meter.—When water enters the cylinder it moves the piston to the other end of cylinder; when the piston meets tappet collar, M, on rod L, it moves L with it, and L, by

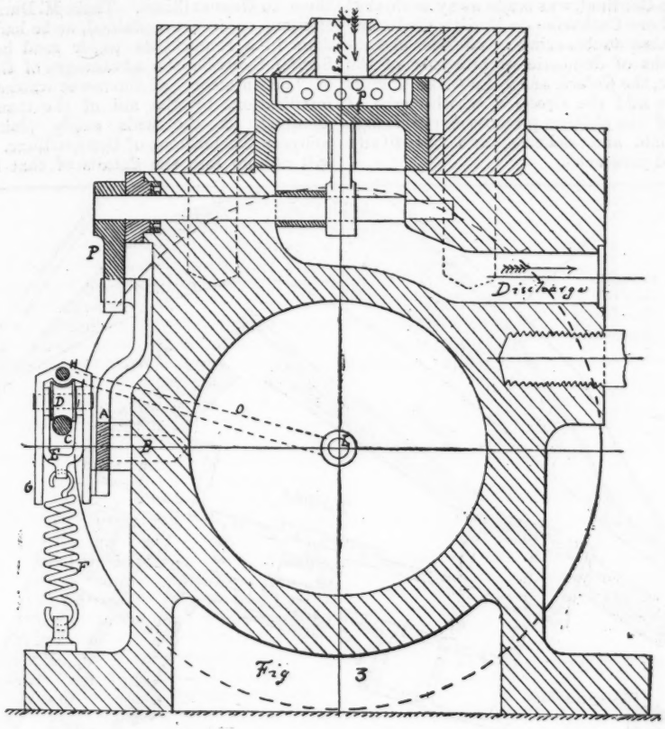
means of cross arm, O, moves rod, H, and fork, G; G shifts wheel and bridle along rod, C, which is inclined as shown. As the wheel and bridle are thus moved they must ascend the inclined rod, C, and the spring is extended. If the lever were free the spring would pull it down, but it is locked by the detent, J. As soon, however, as the piston has finished its stroke *perfectly*, it brings the projection on fork against that on detent, and, pushing it aside, lever C is left free, and is pulled down by the spring. This shifts the slide valve, water is admitted at the other side of piston, and the discharge is opened. When one end of the lever falls the other is raised, and its detent drops under it and locks it. The piston moves again till it meets the other tappet, when it shifts the rods, fork, and bridle once more along C to what is now the higher end, but the lever being locked the spring cannot pull it down till the piston, at the end of its stroke, throws detent off, when the lever, being released, moves the valve, and so the action goes on.

It will be obvious that by this arrangement the piston must complete its stroke perfectly before the slide is moved.

In order to prevent noise or shock by too sudden an alteration of direction in the movement of the water, the supply ports are made V-shaped, as shown on plan (fig. 4), and also a perforated plate, P (figs. 2 and 3), is put on top of valve: this causes the cross section of valve to nearly fill up the valve-box like a piston, and therefore the valve cannot move faster than the water can find its way past it in the box. The plate, P, is loose, and simply held in recesses in the valve, and plates with various sized holes can be put in to suit the different speeds of the meter.

The meter will work at any reasonable speed, and at any pressure. It can be worked either vertically, inclined, or horizontally. It can be enclosed in a casing locked up, and a counter of any well-known pattern can be fitted to register the discharge. The drawing shows the piston at the end of its stroke, and the detent pushed from under the lever, which is ready to fall and move the slide.

H. W. P.



Cross Section.

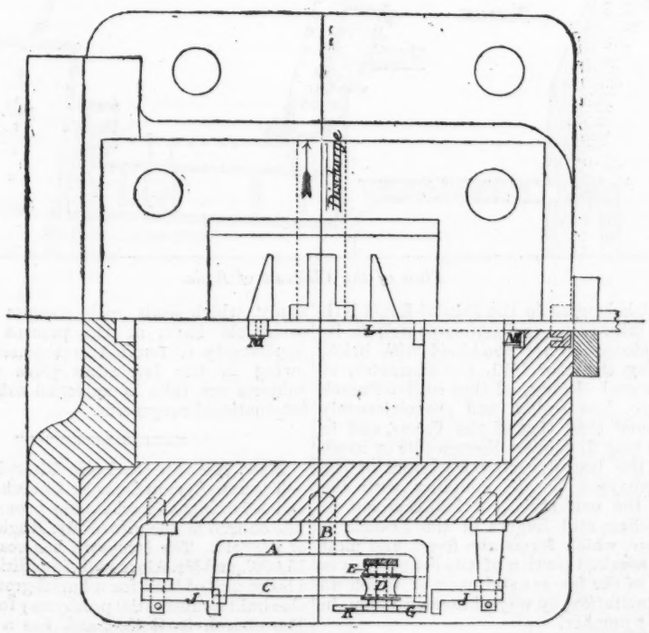


Fig. 4.—Half-Section Plan.

THE CONGRESS OF FRENCH ARCHITECTS.*

ON the third day of the Congress, Wednesday, the 11th ult., about 200 architects assembled to visit the Church of the Sacred Heart, Montmartre, being received by M. Abadie, the architect, member of the Institute. Each visitor received a plan of the building and was to sign his name to an illuminated memorandum of the visit. The church, as may be remembered, was the subject of a competition ten years ago. The subterranean portion is now complete, and the upper portion is beginning to come into shape above ground.† The works are being carried out by M. Riffaud, who is also contractor for the masonry of the Hôtel de Ville, and who has for chief overseer M. Louis Jobert, honoured, like his chief, with one of the medals decreed last year by the Société Centrale des Architectes.

Faithful to the traditions which have been kept up in the workshops for the restorations of the diocesan edifices and historic monuments of France, and which he himself has applied with so much success at Angoulême, Perigueux, Bordeaux, and twenty other less important localities, M. Abadie has taken order that, at the Église de Sacré Cœur, the stone should be brought to the building entirely worked and prepared for its position, so that this builder's yard, alone among those of Paris, echoes no sound of the tool and is encumbered with no *débris* of waste stone; the selection made of the hard stone of Souppes, near Nemours, which is not easily damaged in transit, has been favourable to this method of working.

We need not repeat all the praises which M. Abadie received from his professional brethren, at the head of whom were MM. Bailly and Ch. Questel. We may content ourselves with observing that the construction of the Église de Sacré Cœur is progressing slowly but surely, and that the subscription, which has already amounted to 14,000,000 francs, increases every day, and that M. Abadie, who is just seventy-two and belongs to a family who are of octogenarian habits, may, we hope, be called upon before long to preside at the dedication of his fine building.

In the afternoon of the same day, M. Bresson, delegate and past president of the Société Académique of Lyons, occupied the chair, and in a short address spoke of the work they had that morning seen, and of the brilliant career of M. Abadie, amid much applause. The secretary then read a letter, the official character of which rather served to emphasise its cordiality of tone, from Mr. W. H. White, secretary of the Royal Institute of British Architects, in the name of Mr. Ewan Christian, their president, thanking the Société Centrale for their invitation to the president and secretaries of the English Institute to be present at the Congress and at the dinner on the 14th; a letter which was very warmly received, many of the members having learned the same morning that the Institute had just given a pledge of the friendship between the two societies in nominating, at their last meeting, on the 9th, M. Alfred Normand, one of the vice-presidents of the Société Centrale, as Honorary and Corresponding Member of their body. According to the order of the day, papers were first read by M. Ernest Desjardins, the eminent archæologist, Membre de l'Académie des Inscriptions and Belles Lettres, on "the milestone of the cemetery of St. Marcel in the Republic of San Marino" and on the French foot-measure (*le pied Gaulois*). This milestone, of which a cast provided by M. Jules Cousin, Conservator of the *Musée Carnavalet*, was exhibited, is the oldest monument in France bearing (in an abbreviated form, it is true) the modern name of *Paris*; and, in a learned though familiar dissertation, M. Desjardins explained that this milestone, the first placed on one of the roads from Paris to Rheims, must have been fixed about the year 307 A.D., and was a relic of Golerius Maximinius. Some interesting information in regard to the Republic of San Marino, its patricians, its resources, and its Museum of Relics, made an amusing diversion from the more severe archæological deductions to which M. Desjardins returned at the close in the consideration of the dimensions of the *pied Gaulois*, which he considered to be established as equal to the *pied du roi*.

* See p. 893, *ante*.

† A double page external view of this church was given in our volume for 1878, p.p. 406-7. An internal view appeared in our number for Feb. 7, 1880.

After the thanks of the meeting had been given to M. Desjardins for his interesting communication, M. Wallon followed with the reading of a long memoir on "Public Competitions." This question had been raised, he observed, in 1861 by M. César Daly, in the *Revue Générale de l'Architecture*, and since then there had been the following stages in the progress of the matter:—

1. The list of questions proposed by the late M. Davioud in 1872.

2. The memorandum of the Société des Architectes du Department du Nord in 1874.

3. The discussions of the International Congress in 1878.

4. The *résumé*, produced at the Congress of 1882, by M. Ch. Lucas, of the study of the question by the Royal Institute of British Architects.

5. The decision of that Institute which had been communicated to the Congress of 1883.

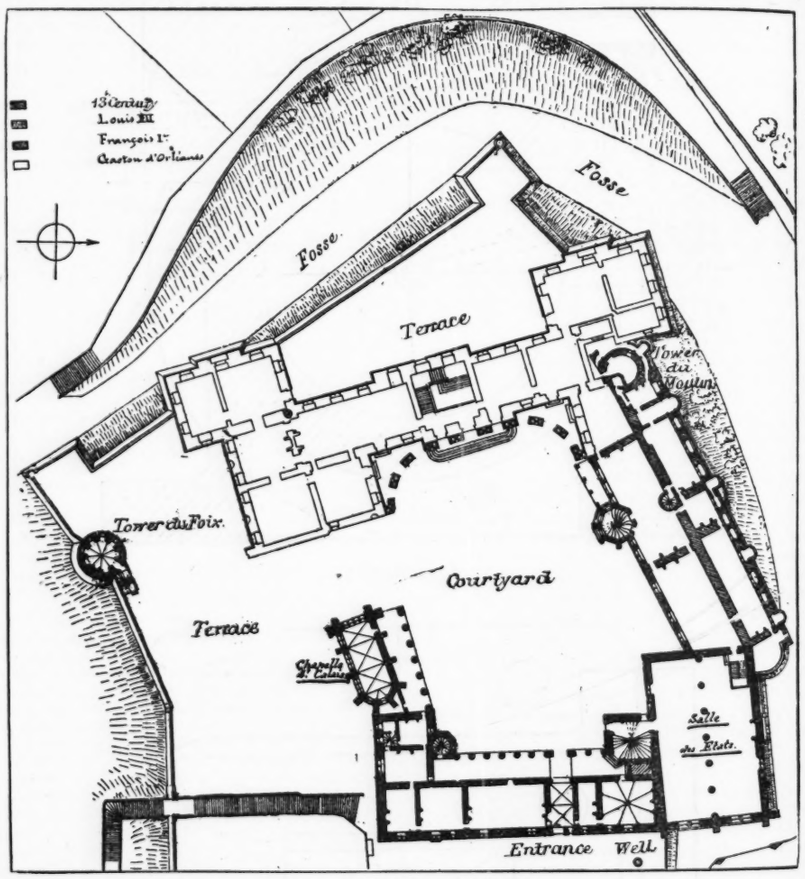
At that time, said M. Wallon, it had been proposed by M. Chas. Lucas to refer the whole question to an international commission; but that idea having been negatived, and the last congress having expressed a strong opinion that the subject should be considered at the present congress, he had prepared this paper (part of which we shall be able to publish subsequently), merely observing here that M. Wallon's general view was against the official regulation of competitions, and in favour rather of the endeavour to gradually develop a public opinion in the right direction.

In the discussion which followed, M. Chas. Garnier said that, formerly a competitor, now more often an assessor or judge, he had listened with interest to the excellent things said by M. Wallon, but he thought everything human had its bad side, and public competitions more especially; the first business of competitors was to look out for themselves,—in fact, they very often went into a competition without taking the trouble to look into the initial defects and improprieties in the conditions, and without protesting against them as they ought. When a competition was announced, said M. Garnier, then was the time to exercise one's influence in protesting against a defective programme, instead of raising complaints after the result of the competition had been made known.

At the close of the meeting (after a few words from the President) there were handed round copies of the rules of the recently-founded "Société des Amis des Monuments Parisiens," constituted with the object of watching over the ancient art and "Physionomie Monumentale" of Paris. This might be supposed to be a kind of parallel to our "Anti-Scrape" Society, only that it appears to be composed not of sentimental amateurs, but of many of the leading French architects of the day, including MM. Abadie, André, Bailly, Ballu, Cervesson, Corroyer, Daumet, Ch. Garnier, Hardy, Ch. Lucas, Alf. and Chas. Normand, Ruprich-Robert, Sauvageot, Sedille, Questel, Vaudremer, and Wallon. We may hope, therefore, that its tone and its proceedings will be at once more reasonable and more practical than those of the English society which is popularly known by the sobriquet above quoted.

On the fourth day of the Congress an excursion was made out of Paris, as in previous years; and the Congress having on other occasions visited St. Germain, Versailles, Fontainebleau, Amiens, Rheims, Chartres, Chantilly, and Pierrefonds, it was decided this year to visit Blois. About eighty members met at the Gare du Chemin-de-fer d'Orléans at half-past eight, and, having breakfasted *en route* at Aubrais, they came to Blois with the whole afternoon to give to the town and château, so coquettishly poised in its amphitheatre on the Loire, where M. Baudet, architect of diocesan buildings and of the "Monuments Historiques," who has been charged since 1879 with the work of restoration at Blois, did the honours with great cordiality.

The small plan of the château here given may serve to recall, by the various ways of shading, the dates of the main portion of the building, which belongs to the different epochs of the Comtes de Blois (twelfth century), Louis XII. (end of the fifteenth century), Francis I. and the Valois (sixteenth century), and lastly, Gaston d'Orléans (seventeenth century). Unfortunately, the late illustrious Duban, and, with and after him, his devoted lieutenant, M. de la Morandière, have restored a brilliant youthfulness to the Middle-Age and Renaissance portions of the building; and even commenced the restoration of the buildings erected by François Mansard for Gaston d'Orléans; these latter constructions, which M. Baudet now has actually under his care, are still far from having regained their primitive splendour. All our readers know how intimately the Château of Blois is connected with the History of France, and what great historic as well as architectural interest attaches to that "Salle des États" where Henri III. proclaimed himself chief of the League; those royal apartments of the Valois, where the Duke of Guise was assassinated; that *Tour du Moulin* or *des Oubliettes*, where his brother, the Cardinal, was made away with, that chamber where Catharine de Medicis died some days after that double crime; and those charming specimens of domestic architecture of the Renaissance, the *Galerie* and *Toilette*, the *Cabinet de la Reine* and the *Oratoire*, which make of that part of the château an *ensemble* of things graceful, rich, and delicate, and beautifully restored and preserved.



Plan of the Château of Blois.

The part belonging to the date of Louis XII. is not less interesting, and expresses well in its façade of stone, cleverly combined with brick, and bearing the date 1501, the character, at once sober and elegant, of that earlier French Renaissance, less Italian and proportionately more national than that of the Valois, and in which one may find, in no disagreeable or harsh contrast, the last lingering souvenirs of the late Flamboyant Gothic mingling with the details of the new style. A half-remnant of Gothic feeling still lingers in the Francis I. architecture, which forms the finest and most generally admired portion of the château, as in the newel of the famous staircase, of which we give an illustration, by way of memorandum, in the present number.

When M. Baudet shall have completed the *Aile de Gaston* (where is to be installed, we believe, the Municipal Library), this portion, at present a little slighted by architects and archæologists, will take the place it deserves in general interest; for, besides the colonnades which, on the court side, accompany the principal entrance, it offers large and fine rooms, admirably served by the staircase, which is one of the most beautiful examples of the work of François Mansard.

After entering the château, the party went to the church of St. Nicolas (or St. Laumer), a curious specimen of the Transitional style and of the Early Gothic, and then inspected various objects of interest in the town, the Fontaine Louis XII., the Hôtels Sardini, d'Alluye, Denis Dupont, and Gaillard, now the Presbytery of the Église St. Nicolas, and some even found time to traverse in haste the stone bridge with its obelisk, and reach the Église St. Saturnin, in the Faubourg de Vienne, and the General Hospital, of which the cloister, with its Renaissance colonnade, merits special mention.

On Friday, the 13th, at nine, there was a rendezvous at the Gare St. Lazare for the visit to Asnières, where brakes, put at the disposal of the party by M. Alphand, waited to conduct them to Gennevilliers. There M. Durand-Clay, sanitary engineer, explained, as he had already done in a remarkable paper read before the Société Centrale, the advantages of the system of "decantation" of the sewer waters, and the fertilisation, by the aid of the manure thus obtained, of the wide sandy plains which compose the Isthmus of Gennevilliers. But we will not go into the details of that technical study, which dealt with matters with which architects have, at the present day, ample opportunity to familiarise themselves, partly owing to the important place which these subjects now take in universal exhibitions and international congresses.

New Roman Catholic Church, Parbold.—The new Roman Catholic Church of Our Lady and All Saints at Parbold has been consecrated. The church is the gift of Mr. Hugh Ainscough, of Parbold. The structure has cost altogether 15,000*l.*, and Mr. Ainscough, in addition, has given a large plot of land for a burial-ground, and has also built a substantial presbytery for the pastor. The church is Gothic, and has a tall steeple which can be seen for miles around. The building is entirely of local stone. The roof is supported by two rows of plain massive pillars, and the fittings are most elaborate and complete. The altar is constructed of marble and alabaster, and the altar window is large and ingeniously carved. The altar and reredos have been executed by Messrs. Sherratt & Ovens, of Preston. The church has been built from designs by Mr. Edmund Kirby, architect, of Liverpool, and the building operations have been carried out by the workpeople employed by Mr. Ainscough. At the present time there are sittings for 400 people, but the church is capable of accommodating 500.

A MODEL BAKERY.

AT the invitation of Messrs. W. Hill & Son, of Bishopsgate and Victoria-street, a number of gentlemen on Saturday last visited the new Model Bakery just opened by the firm in Alexander-street, Westbourne Park.

The *modus operandi* pursued by Messrs. Hill at this bakery presents some points well worth notice. To begin with, the water which is used in the bakery flows from a cistern which is completely cut off from the rest of the water supply, through one of Johnson's patent filter presses,—an ingenious combination of coils of iron and of blotting-paper that is especially prepared for the purposes of filtration. This paper is very frequently renewed. The potatoes, a small quantity of which enters into the earlier stages of all bread-making on an important scale, are not boiled "willy nilly" and added to the yeast in the customary manner, but are steamed in separate perforated chambers, and by that means freed from fusel oil and all other deleterious and offensive matters. The potato-starch, thus purely prepared, is amalgamated with the yeast-plant, and fermentation proceeds on a plan which has been brought to perfection by Mr. Hill after experiments extending over a period of eighteen months. Thenceforward every successive stage in the manufacture of the bread is carried out with the aid of machinery, and, throughout, the proper temperature is regulated by means of thermometer tests. Nothing, indeed, is left to chance or "the rule of thumb." The dough is manipulated by Pfleiderer's dough-making machine, containing revolving blades that bear some resemblance to the screw propeller of an ocean steamer. In order to overcome the obstacle which occasionally interferes with the successful kneading of dough by machinery,—the difficulty of keeping a proper temperature, and thereby preventing the arrest of graduated fermentation,—the mixing receptacle is encased in a hollow wooden jacket and kept warm by means of a pipe which conveys the necessary stream from an adjacent boiler. And now, mixing and kneading and every concurrent operation having been accomplished, and that without handling, the dough is projected into movable troughs, wheeled into the bakehouse, weighed, and moulded, and in due course placed in the oven. A particularly sweet, nutty flavour which Messrs. Hill claim to give to the bread here produced is partially attributable to the fact of its being baked in ovens heated with hazel-wood and similar aromatic "bavins."

The bakehouse is an underground one, but is well lighted and ventilated, special conveniences being provided for the *employés* quite away from it. The arrangement is, however, as we understand, only tentative, Messrs. Hill having taken and adapted to their present experimental purposes an ordinary baker's shop and bakery.

In the course of the proceedings Mr. Lakeman, H.M. Inspector of Factories, spoke highly of the arrangements, as did Dr. Tripe, Dr. Wynter Blythe, Dr. Lovett, Dr. Lee, and one or two trade experts. One point of contention there was between Mr. Lakeman and Dr. Tripe, Mr. Lakeman contending (without reference to the bakehouse under notice) that, as a rule, bakehouses should never be underground; for, if they were, they would most likely be dark and dirty. Dr. Tripe, on the other hand, contended that an underground bakehouse, provided it was well lighted, well ventilated, and properly "sanitated" in every other respect (and unless it complied with these conditions it should *never* be allowed), was better than one above ground, because a more equable temperature could be maintained underground, equability of temperature being an important factor in bakehouse economy.

The Russian Cement Industry.—The French consul at St. Petersburg has communicated to his Government some information on the above subject. The manufacture of Portland cement is only represented in the St. Petersburg district by a large establishment at Port Kunda, on the coast of Esthonia (the annual production of which is about 7,400 tons), and by a smaller factory, near the capital. The last re-adjustment of the customs tariff has been favourable to the development of the industry. Plaster is made on a large scale at St. Petersburg, this industry occupying seven factories, which produce annually 23,000 tons.

ARCHITECTURE AT UNIVERSITY COLLEGE.

THE following list of awards to students has been forwarded to us by Professor Roger Smith:—

Fine Art.

Donaldson Silver Medal ...	E. Nicholson, London.
Second Prize	José Suarez, Bogota.
Third Class.....	W. H. Eve, London. E. F. King, London.

Construction.

Donaldson Silver Medal ...	E. W. Knight, Greenwich.
Second Prize	A. T. Bolton, London.
Third Certificate*.....	Frank Taylor, London.
Fourth Certificate*	R. M. Hamilton, New Zealand.
Second Class	J. R. Morgan, London. F. W. Quick, London.
Third Class.....	T. D. Atkinson, London. C. F. Blomfield, London. E. F. King, London. F. Swift, Peckham. J. M. Watson, London.

Modern Practice.

Prize	W. C. Jones, Forest Hill.
Second Certificate*	J. R. Morgan, London.
Third Certificate*.....	E. L. Conder, Leeds and London.
Fourth Certificate,* equal	R. L. Cole, London. W. Millard, London.
Second Class	R. M. Hamilton, New Zealand. F. W. Quick, London.
Third Class.....	T. G. Williams, Liverpool.

HATCHETT'S HOTEL.

SIR,—In your last issue [p. 911] there appears a description of Hatchett's Hotel. In justice to Mr. J. Grover, of the New North-road, we would point out that he is the contractor, and not Messrs. Higgs & Hill. The contract sum is also incorrect; and the stone used is Ancaster, not Portland.

W. S. WEATHERLEY & F. E. JONES.

20, *Cockspur-street, London, S.W.*

ARBITRATION CASE.

CLARK *v.* BOOTH.

THE plaintiff is a contractor at York, and built the new Salvation Army "Barracks" there, which were completed in 1883.

The contract sum was 2,160*l.* In carrying out the work various extras occurred, such as additional foundations, and sundry other items not provided in the contract. The building, under the terms of the contract, was to be completed by a specified time under a penalty of 10*l.* per week, to be forfeited by the contractor to the proprietor for each and every week it remained incomplete after that date. A proviso was made, however, that for every 30*l.* of extra work done by the contractor, an extra week's time was to be allowed to him. The building was not completed until some weeks after the time specified: this, it was alleged by the plaintiff, being due partly to the additional work executed, bad weather, and other causes.

The plaintiff's account for extra work not being agreed to, he eventually brought an action against the defendant at the Leeds Assizes in January last for 551*l.* 12s. 10d. for balance due under the contract, and for extra work. The defendant paid into Court the sum of 325*l.*

When the case came before the Judge, it was ordered to be referred, and Mr. Walton, barrister, was appointed arbitrator. The case was partly heard at Leeds in the first instance, afterwards at York, and was completed in London, and has occupied twelve days. The defendant admitted the principal part of the extra work charged for as having been done, but argued that the contract quantities for the original building were greatly in excess, and set up a number of counter claims for works said not to have been executed, also penalty for delay in the completion of the building.

The award has just been declared, and the arbitrator has given the plaintiff the sum of 110*l.* 5s. 2d. in addition to the 325*l.* paid into court, the defendant to pay all the costs of the action.

Mr. Wilberforce, barrister, has conducted the case on behalf of the plaintiff, and Messrs. L. & W. Thompson, of York, have been the solicitors, and Mr. W. Brown, architect and surveyor, York, was engaged for the plaintiff. For the defendant, Mr. Sutherst, barrister, appeared, and his case was also represented by Mr. E. J. Sherwood, the defendant's architect, and Mr. Caine, architect, Manchester, and Mr. Thorp, architect, Leeds.

* Obtained marks qualifying for a prize.

STAINED GLASS.

Swansea.—Two large stained-glass windows have just been placed in St. John's Church, Gower-road, Swansea. The east window, which consists of three lights, has for its subject The Ascension. Our Lord ascending, clothed in light garments, against a rich background, and surrounded by seraphim, forms the central object of vision, and beneath a cloud at his feet are the Mother of Our Lord and St. John the beloved disciple gazing at their departing Lord. In the side lights are the other disciples kneeling or standing, gazing and adoring Our Lord. The subject, which runs through the three lights, is richly treated as to colour, and is placed upon a base of ornamental work, and under canopies of similar treatment. The south side of the chancel has a three-light window and single light in which the subjects represented are as follows:—First light: "The Call of St. John from his Fishermen Toil of Mending Nets." Second: "The beloved Disciple leaning upon Our Lord's Breast." Third: "St. John on the Mount of Transfiguration"; and the last single light, "St. John in exile at Patmos." The scene depicted in the last light is when the vision of the Lamb burst upon St. John. The cartoons for these windows were prepared by Mr. J. W. Camm, and the work has been carried out by Messrs. R. W. Winfield & Co. (successors to Camm Brothers), Cambridge-street, Birmingham.

Bournemouth.—The fine five-light east window of St. Michael's Church, Bournemouth, has lately been filled with Munich stained glass, the gift of Miss Durrant, of Branstead Hall, Norfolk, in memory of her uncle, the late Mr. George Durrant, of Norwich, through whose beneficent acts the church was mainly erected. The text illustrated is Matt. xi. 28,—"Come unto Me, all ye that labour." The window is by Messrs. Mayer & Co., of Munich and London.

Langham.—Three ornamental windows have lately been erected in the Parish Church of Langham, near Colchester. In it various texts of Scripture have been illustrated by trees or plants, such as the "Yew," the "Olive," the "Thorn," and "Immortelles." These works are from the studios of Messrs. Mayer & Co.

Eastbury.—The east window of Eastbury Church, Lamborne, Berkshire, has had a stained-glass memorial to the memory of the vicar's wife, placed in it by her husband, the Rev. G. F. Forbes. It is a five-light window, of the Decorated style of architecture, with a number of openings in the tracery. The subject chosen is the "Ascension," the figure of the Saviour being in the centre, opening with groups of angels surrounding him on a ruby ground, diapered with stars, and beneath him the Virgin Mary and St. John, with the other disciples, grouped on either side, on a blue ground. The work has been carried out by the firm of Ward & Hughes, of Frith-street, Soho, London, who lately executed the side window in the same church.

Northfleet.—A stained-glass window has been placed in the chancel of Northfleet Church, Kent. The window is of two lights, and contains figures of SS. Philip and Bartholomew. The window was designed and executed by Messrs. Warrington & Co., of Fitzroy-square.

Hartley Wintney.—The new south transept window of Hartley Wintney parish church has been erected in memory of Mr. John Measure, barrister-at-law, late of Sherwoods, who died on the 25th of November, 1882, aged eighty-five. In the top tracery, above the four lights, our Lord is represented as seated in glory. In the upper portion of each of the lights is a full-length figure of an Evangelist, with a copy of the Gospel in his hand, and in the lower portion is depicted an incident specially characteristic of the life or record of each. At the bottom of each light the symbols of the Evangelists are introduced. The canopy work has the figures of angels introduced, and the general effect is described as eminently satisfactory. The artists were Messrs. Lavers, Westlake, & Co., of Endell-street, Bloomsbury.

Withycombe.—The memorial-stones of a small Wesleyan chapel at Withycombe, near Exmouth, Devon, have been laid. The work of building the chapel has been placed in the hands of Messrs. Perry & Son, of Exmouth, and the architect is Mr. Carter, also of Exmouth.

Books.

The Admission Registers of St. Paul's School, from 1748 *to* 1876. Edited, with biographical Notices and Notes on the earlier Masters and Scholars of the School from the time of its foundation, by Rev. ROBERT B. GARDINER, M.A. London: G. Bell. 1884.

THE above is the lengthy title of a painstaking volume, in which much of the past history of Dean Colet's celebrated school is carefully given. The school buildings, facing the east end of St. Paul's Cathedral, occupy a position of prominence to which it cannot be said that they impart any additional beauty. They were erected in 1823, in place of the inconvenient structure which had stood, though not without support, since 1670, and which (according to Strype, who was educated within its walls) "was built much after the same manner and proportion" as the original school, completed in 1510. A noisy thoroughfare is, without question, a most unsuitable spot for educational purposes, and in the course of the present year St. Paul's is to be removed to ampler and more secluded quarters at West Kensington. Hitherto, in accordance with the founder's wishes, the number of scholars has been limited to 153; in future it may reach 1,000. The muster-roll of great men who spent some of their boyhood within the school walls is a long one, and includes the names of Milton and his critic, Bentley; John, Duke of Marlborough; Samuel Pepys, the annalist; Leland, Camden, and Gale, the antiquaries; Halley, the astronomer; and, in our own times, Lord-Chancellor Truro, Chief Baron Pollock, Professor Jowett, and several bishops. Mr. Gardiner has added greatly to the value of his book by the introduction of ground-plans of the three successive schools, and has given in an appendix much information about the nature and uses of the buildings; but even he does not seem to have discovered the names of their respective architects.

BUILDING PATENT RECORD.*

APPLICATIONS FOR LETTERS PATENT.

June 13.—8,927, T. Tobitt, London, Window-sashes. — 8,929, F. West, Lewisham, Portable Travelling Scaffold and Concrete Elevator.—8,930, J. T. Richardson, London, Air-tight Receptacle for Refuse, &c.—8,931, R. Schomburg, London, Spraying Apparatus for Ventilation, &c.—8,943, S. Bivort, Jumet, Belgium, Pavement or Flooring.

June 16.—8,997, O. Gibbons, Ironbridge, Making and Ornamenting Plastic Clay Slabs, Tiles, Architectural Ornaments, &c.—9,003, T. B. Burns, Camelford, Securing Thatch on Houses, &c.—9,006, J. Adair, Waterford, Kitchen Ranges, &c.—9,018, C. Toope, London, Fireproof Blocks or Slabs.—9,028, W. Lord, Middlesbrough, Ventilation.

June 17.—9,071, R. H. Hepburn, London, Prevention of Smoke in Domestic Fire-grates.—9,073, R. W. Boyd, London, Stove for Introducing Fresh Warmed Air.—9,114, H. B. Bourne and H. R. F. Bourne, Castors for Furniture.

June 18.—9,119, W. Potts, Edinburgh, Ventilating Buildings, &c.—9,126, J. Thomas, Wrenbury, Hinges.—9,130, J. S. Haslip, Maidstone, Concrete Building.

June 19.—9,164, G. Birkitt, Derby, Cooking Ranges.—9,172, W. Morgan, Birmingham, Latches for Gates and Doors.—9,180, T. McGrall, Sheffield, Domestic Cinder-raker.—9,181, E. Verity and J. M. Verity, Leeds, Chimney-cowl.—9,200, C. D. Abel, London, Fireproof Dwelling-houses, &c. Com. by P. Franquin, Paris.—9,207, J. Whiteley, Salford, Treads of Staircases, Flooring, &c.

SPECIFICATIONS ACCEPTED.†

June 17.—7,273, H. J. Allison, London, Door-bolt and Burglar Alarm. Com. by R. G. Vassar, New York, U.S.A.

June 20.—822, A. C. Smith, London, Spiral Up-draught Exhaust Chimney-cowl and Roof Ventilator.—7,119, J. T. Thompson and W. Thompson, Wexford, Concrete Building.—7,799, W. J. Gwynn, Malvern, Folding-steps.

ABRIDGMENTS OF SPECIFICATIONS

Published during the week ending June 21, 1884.

5,102, G. Davies, Manchester, Stoves. Com. by F. Jackson, San Francisco, U.S.A. (Oct. 27, 1883, price 6d.)

The fireplace has three grates, two of which are horizontal and hung on pivots, and levers are fitted by which they can be raised or lowered. The third grate is curved and hung in front to prevent the coal on the other two falling out when they are lowered. The flue passes from the back downwards below the oven and round the same, then over the top plate thereof to the chimney. The sides of the oven are corrugated. Meat to be roasted is attached to a spit fitted on an axle in the oven, and passing out at the sides thereof, which is driven by a worm and wheel actuated by a smoke-jack in the chimney.

5,112, J. W. Gibbs, Liverpool, Ventilators. (Oct. 29, '83, 6d.)

This is an improvement on Patent No. 3,515 of 1881 in enlarging the holes and covering them with a series of counter-balanced levers. The four openings also are formed into cowls and the cross-divisions are taken well down into the shaft.

5,211, G. W. von Nawrocki, Berlin, Floors, Thresholds, &c. Com. by Messrs. F. Arnecke & Co., Blankenburg, Germany. (Nov. 2, '83, 6d.)

Pieces of cross-grained or diagonally-grained wood are placed in positions where there is much wear and are glued to long planks and secured thereon by feathers.

5,216, F. A. Wendt, Croydon, Ventilating Rooms, &c., and Preventing Smoke. (Nov. 2, '83, 2d.)

The fresh air is admitted through ventilating bricks, and the pipes open through the floor of the room where the mouths thereof are governed by rotating perforated discs. When one is placed near the fire the current of air assists to consume the smoke.

5,221, F. U. Seyde, Birmingham, Curtains and Drop-scenes for Theatres, &c. (Nov. 2, '83, 6d.)

To confine the fire to the place where it originated the curtains, &c., are formed of wire gauze, which may be covered as desired.

5,270, T. Bauchop, Alloa, Ventilator. (Nov. 7, '83, 6d.)

A tube leads from the room to be ventilated, and surrounding its end is a larger tapered tube above which again is another similar tapered tube, and above all a conical cap. Annular openings are left below the cap and between the two tapered tubes. A cylinder surrounds all, which has also a conical top. The air, therefore, rising from the room is deflected through the annular openings, and passes up the outer cylinder.

5,285, E. Barber and B. Barber, Tring, Blinds. (Nov. 8, '83, 2d.)

These Venetian blinds have an additional lifting-cord, which is secured to one of the middle laths, so that the blind may be drawn half way up, and the closed laths are at the top and not as is usual at the bottom. (*Pro. Pro.*)

5,899, D. Clarke, Birmingham, Arrangement of Tiles for Educational Purposes. (Dec. 28, '83, 2d.)

The faces of these tiles are decorated with suitable designs and are applied to the walls, dado, or other surfaces for educational purposes.

* Compiled by Hart & Co., Patent Agents, 186, Fleet-street.

† Open to public inspection for two months from the dates named.

MEETINGS.

SATURDAY, JUNE 28.

St. Paul's Ecclesiological Society.—Visit to the Churches of East Barnet and Monken Hadley. Papers will be read by the Rev. C. E. Hadow and the Rev. F. C. Cass. Train leaves Moorgate-street at 2.38 p.m.

MONDAY, JUNE 30.

Victoria Institute.—Annual Meeting. 8 p.m.

THURSDAY, JULY 3.

Royal Archæological Institute.—(I) Professor B. Lewis on "Roman Antiquities in Switzerland"; (II) Mr. R. C. Hope, F.S.A., "On the Church Plate of Rutlandshire"; (III) Mr. F. Helmore on "Stone Coffins lately discovered in Herts."

Miscellanea.

Value of Building Land in Wandsworth-road.—Last week Messrs. Hards, Vaughan, & Jenkinson submitted for sale, at the Auction Mart, the extensive freehold property known as the Springfield Estate, situated at Vauxhall, fronting the Wandsworth-road. The property consists of about ten acres and a half of freehold building land, with a frontage to the Wandsworth-road of 766 ft. in length, and abutting in the rear on the London and South-Western Railway Company's works. It also included about fifty houses. The property was described as particularly worth the attention of societies and others contemplating the erection of dwellings for artisans. It was added that it might be reasonably expected that in this situation such dwellings would command higher rents than those situated even as far as three miles from the centre of London, where there was a constant supply of tenants at rents varying from 2s. to 3s. per room. The property was offered in six lots. The first lot offered consisted of 80,840 square feet, with a frontage of 167 ft. to Wandsworth-road, for which 9,000*l.* was the highest sum offered, but which was bought in at 10,000*l.* For the next lot, containing 104,500 square feet, with a frontage of 208 ft. to the Wandsworth-road, 9,000*l.* was the first offer, and the highest bid 11,600*l.*, the lot being bought in at 12,500*l.* Two other lots, one containing 71,650 square feet, with a frontage of 151 ft. to Wandsworth-road, and the other containing 74,300 square feet, with a frontage of 150 ft. to Wandsworth-road, were each bid for up to 8,000*l.*, but bought in at 9,000*l.* Two other lots, containing respectively 57,600 ft., and 44,650 ft., were withdrawn. For the four lots thus submitted an aggregate sum of 36,600*l.* was offered, being at the rate of about 4,500*l.* an acre, but bought in at 5,000*l.* an acre.

Co-operative Shoe Works, Leicester.—The extension to the Co-operative Shoe Works, Dun's-lane, Leicester, has been formally opened in the presence of a number of the members of the Co-operative Central Board and the Co-operative Wholesale Society; Mr. J. Stansfield, of Heckmondwike, chairman of the Productive Committee, presiding. The structure as now enlarged forms one of the most extensive shoe factories in Leicester. The building occupies a triangular site, with a frontage of about 190 ft. to Dun's-lane, and about 200 ft. to the river Soar. Th main block consists of five large flats, each containing about 8,600 square feet, all well lighted from the frontages, and also from a central yard or area. A lower (three-story) building occupies the south-western portion of the site. The architecture of the building is of Classic character. The materials for the principal fronts are red pressed bricks, with ornamental dressings of Coalville and Reading brick, Coalville terra cotta, and Derbyshire stone. The principal front is that towards Dun's-lane, the length being 190 ft., and the height of the main block 60 ft. from the street level to the top of the parapet. The central block is crowned with a bold frieze and pediment, the tympanum being enriched with arabesque ornament in carved brick. The building is heated throughout by steam on the high-pressure system. For ventilation, fresh air is admitted by means of numerous upright shafts, the foul air being extracted by flues carried up above the roof, and fitted with patent extraction ventilators. The contractors for the works are as follow:—Builder's work, Mr. J. O. Jewsbury; carpenter and joiner's work, Mr. J. Cox; ironfounder's work, Messrs. Illston & Arnold; plumber's, glazier's, and painter's work, Messrs. Norman & Underwood. The m[illegible] work has been executed by Mr. A. Wes[illegible], and the carving in brick and stone by Mr. S. Wilmott. The heating is by Mr. Thompson, of Rawdon, and the hoist work by Messrs. Waygood & Co., of London. The architect is Mr. J. Tait.

Society of Arts.—A *conversazione* will be held at the International Health Exhibition by the Council of the Society of Arts, in conjunction with the Executive Council of the Exhibition, on Wednesday evening, the 9th of July. The whole of the buildings will be open, and the gardens will be illuminated. — The Council of the Society have awarded the Society's Silver Medals to the following readers of papers during the session, 1883-4:—

To the Most Hon. the Marquis of Lorne, K.T., for his paper on "Canada and its Products."

To Rev. J. A. Rivington for his paper on a "New Process of Permanent Mural Painting, invented by Joseph Keim."

To C. V. Boys, for his paper on "Bicycles and Tricycles."

To Professor Fleeming Jenkin, F.R.S., for his paper on "Telpherage."

To I. Probert, for his paper on "Primary Batteries for Electric Lighting."

To H. H. Johnston, for his paper on "The Portuguese Colonies of West Africa."

To Professor Silvanus P. Thompson, for his paper on "Recent Progress in Dynamo-Electric Machinery."

To Edward C. Stanford, F.C.S., for his paper on "Economic Applications of Seaweed."

To W. Seton-Karr, for his paper on "The New Bengal Rent Bill."

To C. Purdon Clarke, C.I.E., for his paper on "Street Architecture in India."

Proposed Re-building of the City Freemen's Almshouses at Brixton.—On the report of the Freemen's Orphan School Committee on a reference of April 3rd, 1884, to advertise for designs and estimates for the re-erection of the London almshouses at Brixton, and to submit the same for approval, the Court of Common Council has resolved to adopt the design bearing the motto "Through Ventilation," the cost of executing which was put at 8,500*l.*; and have awarded the sum of 50*l.* to the authors of the design "*Domine Dirige Nos*," estimated to cost 10,600*l.* Messrs. Davis & Emanuel are the authors of "Through Ventilation," and Messrs. Hooker & Hemings of "*Domine Dirige Nos.*"

The Labour Market in Canada.—The Montreal *Daily Witness*, of the 9th inst., strongly deprecates unrestrained emigration to Canada, and contradicts statements made in this country to the effect that work of all kinds is plentiful in the colony. There is, doubtless, says the *Witness*, room and work for thrifty farm-labourers, but not for unassisted emigrants who know nothing of agricultural work.

Sanitary Statistics at Whitehall.—The resignation of Mr. Frederick Purdy of the office of Principal of the Statistical Department of the Local Government Board, after a service under the Crown of no less than forty-eight years, suggests a variety of reflections. If Mr. Purdy were to put his experiences into writing, we might get an idea, denied to the coming generation, of the way in which things were managed when her present Majesty came to the throne. Those were the days before germs and bacteria and sewers and "zymotics" were heard of. No troublesome figures about local taxation puzzled the heads of economists. Mr. Bumble then exercised imperial sway in the poor-houses, and no interfering inspectors popped in at inconvenient moments to taste the porridge or check the parish books. Mr. Purdy in his day has give to the world many millions of figures about one and another branch of Poor Law and sanitary work; but for the most part these have fallen flat upon an unregenerate and ungrateful public. So far as statistics can help us, there is by this time a sufficiently large accumulation of facts at hand to warrant some sort of general conclusion as to the results, from a sanitary and necrological point of view, of the expenditure on drainage, water supply, and the like, of the last twenty years or so. But the figures as to expenditure are immured at Whitehall, and the figures as to deaths at Somerset House. Might it not be feasible, and would it not be very useful, that the two statistical staffs that own one supreme head should be amalgamated, or, at least, so co-ordinated that some sanitary statistics really worth having could be issued in a form to be understanded of the people? At present the mass of local indebtedness that goes on increasing after the fashion of a snowball sadly needs justification. —*Sanitary Record.*

The Site of an old City Church in the Auction Market.—A short time ago the Church of St. Matthew, Friday-street, Cheapside, was demolished, this being one of the City churches which was condemned with the view of the sites being sold, and the proceeds applied towards the erection of new churches in other parts of the metropolis. Last week nearly the whole of the site of the church was offered for sale at the Auction Mart, by direction of the Ecclesiastical Commissioners, Messrs. Fuller, Horsey, & Co. being the auctioneers. The rectory-house adjoining was included in the sale. The property has a separate right-of-way into Cheapside through a passage known as Fountain-court. The frontage to Friday-street is 39 ft. in length, and the one facing Church-court is 67 ft. long. The total ground area, including the rectory-house, was described as containing 3,475 ft., but in submitting the property the auctioneer remarked that since the advertisement to sell was issued the Commissioners of Sewers had served notice to take a part of the site to widen Friday-street, and this portion would, therefore, be excluded from the sale. He observed that this intended widening of Friday-street would very materially enhance the value of the site, which the purchaser would have the advantage of without paying for the increased value which the widening of the street would give to the property. As regarded the value of the site he said that, comparing it with other land in the immediate locality, he considered it was well worth 10*l.* per foot, which would represent something like 40,000*l.* The first bid was 15,000*l.*, and by advances of 1,000*l.* and 500*l.* each the property was quickly brought up to 29,500*l.*, when the biddings ceased, on which the auctioneer said he could not sell at that sum, and it was bought in on behalf of the vendors for 29,900*l.*

Cradock Waterworks, South Africa.—The Municipality of Cradock have approved of the scheme for the water supply of that town submitted by Messrs. G. B. Nichols & Sons, civil engineers, of London and Birmingham. The supply is to be derived from permanent springs at Drie Fontein, about five miles from Cradock, on land belonging to Mein Herr Janse Van Rensburg, M.L.A. The water is diverted from the stream into filtering-chambers constructed in connexion with a service reservoir, and conducted into the town by gravitation on the constant-service system, distributed by means of cast-iron pipes with stand-post hydrants. In the Market-square it is proposed to erect a handsome stone fountain for drinking purposes and for the use of cattle.

The Library, International Health Exhibition.—The library, which was opened to the public on Monday, the 16th inst., has been organised by a special sub-committee, appointed in February last by the Executive Council. The original intention was to refer to this department the exhibits comprised within the "Literature" class, under each group of the two divisions into which the Exhibition has been divided. But besides dealing with these exhibits in this way, the Library Sub-committee have brought together a large collection of official reports, central and local, bearing on the administration of sanitary laws at home and abroad. In their endeavours to render this part of their work as complete as possible, they have been much indebted to her Majesty's Government for valuable assistance rendered by the Secretary of State for Foreign Affairs, who, at the request of the Duke of Buckingham and Chandos, the chairman of the Executive Council, caused to be issued to British diplomatic representatives abroad circulars inviting them to obtain lists, accompanied by specimens of reports and works bearing on the administration of the sanitary and education departments of the countries to which they were accredited. The Library Sub-Committee have also been in correspondence with the mayors of boroughs and chairmen of local boards, with a view to obtain copies of local sanitary acts and reports, of which a large number have been received. The Committee have, furthermore, entered into correspondence with the authorities of all the principal health resorts at home and abroad, in order to obtain a collection of guide-books and medical and popular treatises referring to the climatic and other advantages of these places, and, as a result, an interesting feature of the Library will be the varied collection of books and photographs received from a large number of these resorts. Authors and publishers throughout Europe have also been invited to send contributions, and the Committee feel that they are much indebted to them for the ready response made to their appeal. The number of books now received amounts to about 6,000. The room in which the Library has been arranged is in the Albert Hall, overlooking the Conservatory. Its furnishing and decorations have been intrusted to Messrs. Liberty & Co.

The Last of the Grand National Opera House.—The sale of the materials of the unfinished Opera House on the Thames Embankment has taken place during the present week, and in a short time the partly-erected building, which, so far as it had proceeded, cost about 80,000*l.*, will have been cleared away and distributed amongst dealers in building materials, who have purchased them under the hammer for little more than 2,000*l.* The sale embraced 289 lots, of which 157 lots were sold on Tuesday. With the exception of the iron work used in the erection of the box and pit circles, the lots included in the day's sale consisted, for the most part, of blocks of Portland, Bath, and other stone, together with timber and miscellaneous materials which have remained on the ground ever since the works were suspended. Merely nominal prices ruled throughout the day, the several purchasers securing profitable bargains, more especially with reference to the stone. The highest prices obtained during the day were 20*l.* for a cast-iron mortar-mill, 17*l.* for an overhead traveller, 12*l.* each for two other travellers, and prices varying from 12*l.* to 20*l.* each for the timber gantries under the travellers. The iron columns and girders around the pit and box circles realised an aggregate of 220*l.*; the entire proceeds of the day's sale amounting to little more than 560*l.* The sale was continued on Wednesday, when there was a very large attendance, the day's proceeds amounting to 1,540*l.*, which, added to the sum realised by Tuesday's sale, brought up the aggregate amount of the proceeds of the sale to about 2,050*l.* In addition to the materials of the Opera House, the materials of six houses and shops in Cannon-row and Parliament-street were sold, realising 160*l.* The sale was conducted by Mr. C. Horsey, of the firm of Messrs. Fuller, Horsey, Sons, & Co.

The Central Technical College, South Kensington, was opened on Wednesday last by H.R.H. the Prince of Wales. We gave a large view, together with a plan of this building (which has been erected under the superintendence of Mr. Waterhouse, A.R.A.) at the beginning of the present year.

Board Schools, Walton. — On the 16th inst. the foundation-stone of the first schools to be erected by the Walton School Board was laid by the chairman of the Board. The schools, which are to be situated in Arnot-street, off County-road, will cover an area of about 3,000 square yards, and are intended to accommodate about 1,500 children, who will be divided into four nearly equal sections, namely, senior boys, senior girls, juniors mixed, and infants. The several rooms will be so arranged as to admit of their being lighted and ventilated on both sides. It is intended that the upper story shall be utilised as a cookery school for girls. The architect is Mr. Edmund Kirby, of Union-buildings, Cook-street, Liverpool, and the contractor is Mr. Thomas Ray, of Seel-street, Liverpool.

The Institution of Civil Engineers.—During the past five years there has been an increase in the number of Honorary Members from 17 to 21; of Members, from 1,148 to 1,438; of Associate-Members, from 1,200 to 1,864; and of Students, from 591 to 777; while the number of Associates has decreased from 623 to 510. In June, 1879, the total of all classes on the books was 3,579; now it is 4,610.

TENDERS.

For rebuilding premises at Queen's-road, Bayswater, for Mr. W. Whiteley. Mr. J. E. Saunders, architect. Quantities by Mr. Richard Osborn, of No. 153, Fenchurch-street:—

		Time.
Colls & Sons	£69,643	9 months.
Nightingale	68,430	8 ,,
Conder	67,092	9 ,,
Patman & Fotheringham	66,860	10 ,,
McGregor	66,682	8 ,,
Ashby & Horner	66,255	8 ,,
Holland & Hannen	65,380	5 ,,
Brass	64,993	4 ,,
Sheppard	59,710	6 ,,

For re-instating Nos. 5, 6, and 7, Ivy-lane, E.C., Messrs. Smith Bros. Mr. Wimble, architect:—

Smith & Sons	£2,153	0	0
Falkner	2,125	0	0
Scrivener & Co.	2,107	0	0
Laurence & Son	2,085	0	0
Morter	2,077	0	0
Croaker	1,990	0	

For the erection of new school buildings and alterations to Wellington-road Baptist Chapel, Stoke Newington. Mr. Hampden W. Pratt, architect, 6, Duke-street, Adelphi. Quantities by Messrs. Evans & Deacon, 1, Adelaide-street, Charing-cross:—

J. Outhwaite & Son, Smithfield	£1,770	0	0
L. H. & R. Roberts, Islington	1,680	0	0
Higgs & Hill, South Lambeth	1,680	0	0
Chessum, Great Eastern-street	1,572	0	0
Page, Croydon	1,505	0	0
G. Garrud, Hackney-road	1,473	0	0
Wilson & Exton, Aldersgate-street	1,460	0	0
E. Triggs, Clapham	1,294	0	0

For alterations and additions to the Rectory House, Knipton, Leicestershire. Mr. John W. Alexander, architect, Middlesbrough and Stockton-on-Tees. Quantities by Mr. Wm. Lunn, Kidderminster:—

Kirk & Parry, Sleaford	£1,270	0	0
Wartnaby & Son, Grantham	1,150	0	0
J. J. Fast, Melton Mowbray	1,132	0	0
Bardell Bros., Lynn	1,100	0	0
C. Barnes, Melton Mowbray	1,090	0	0
T. Thurman, Cotgrave, Notts	1,023	0	0
Geo. Chester, Waltham *	966	0	0

* Reduced estimate (accepted) £940 2s. 7d.

For building St. John's Vicarage, Stillington, Durham. Mr. John W. Alexander, architect. Quantities by Mr. W. Lunn, Kidderminster:—

Geo. Lazenby, Stockton-on-Tees	£1,332	16	0
Boyd & Harwood, Darlington	1,307	13	2
Craggs & Benson, Stockton	1,264	0	0
John Davison, Stockton	1,193	10	0
L. R. & W. Sturdy, Middlesbrough	1,173	0	0
Renshaw & Walker, Darlington	1,159	0	0
Thos. Dickinson, Saltburn	1,144	0	0
Adam White, Guisborough	1,130	8	8
John Perks, Stockton *	1,102	5	0

* Reduced estimate (accepted), £1,067 8s. 10d.

For building "The Cassidie Memorial Wing" to the Sunday School, Stillington, Durham. Mr. John Wm. Alexander, architect:—

Geo. Lazenby	£350	0	0
Adam White	290	0	0
Craggs & Benson	275	0	0
Renshaw & Walker	249	2	10
J. R. & W. Sturdy	230	0	0
John Perks	215	0	0

For gasfittings, Horns public-house, Hackney-road:—

Biggs	£104	0	0
Stedman	87	12	6
Vaughan & Brown	86	10	0
Winn	75	0	0

For the erection of a cottage and office at Crown Wharf, Canning Town, for Messrs. W. W. Howard Bros. & Co. Mr. S. L. Walters, architect, Norgrove-buildings, Bishopsgate:—

Maddison	£255	0	0
England	244	5	0
Barkel (accepted)	240	0	0

For gasfittings, Coach and Horses public-house, Holloway-road :—

Biggs	£134 0 0
Vaughan & Brown	120 10 0
Buckley	113 10 0
Winn	80 0 0

For making new roads and laying down pipe sewers at Ealing :—

Hebbs	£1,690 0 0
Beadle Bros.	1,609 0 0
Mackenzie	1,432 0 0
Dunmore	1,395 0 0
Pizzey	1,249 0 0
Nowell & Robson	1,229 0 0
Bath & Blackmore	1,121 0 0

For Nantyglo School, for the Aberystruth School Board :—

	Stone Dressings.	Less	Brick Dressings.
J. G. Thomas, Abergavenny	£3,572 0 0	...	73 0 0
H. Welsh, Hereford	2,797 0 0	...	30 0 0
A. P. Williams, Blaina	2,625 0 0	...	—
J. T. Morgan, Nantyglo	2,574 14 0	...	58 12 0
D. Vaughan, Tredegar	2,333 5 0	...	34 17 1
E. Morgan, Tredegar	2,331 10 0*	...	25 0 0
J. Jenkins, Brynmawr	2,215 0 0	...	52 0 0

* Accepted.

For erecting villa-residence in Queen's-road, South Wimbledon, for Mr. J. E. B. Pead. Mr. Sydney B. Grosvenor, architect, 23, Southampton-buildings :—

O. Craske (accepted)	£630 0 0

For main drainage and outfall at Seaton, Devon, for the Urban Sanitary Authority. Mr. F. Eggar, engineer. Quantities by Mr. J. Bartlett :—

Russell & Co., London	£1,512 0 0!
Sanders, Southampton	1,298 0 0
Gibson, Exeter	1,050 0 0
Smith, Newcastle-on-Tyne	1,046 8 6
Turner & Skinner, Honiton	899 0 0
Hawkins, Dawlish	850 0 0
Gould, Newport, Mon.	550 0 0
Pickthall, Highbridge	830 0 0
Whetham, Weymouth (accepted)	695 0 0!

For building warehouse, Slough (exclusive of iron girders, &c.), for Messrs. Elliman, Sons, & Co. Mr. E. Corfield, architect, Slough. Quantities supplied by the architect :—

W. R. Cubitt, London	£4,150 0 0
T. G. Hearn, Slough	3,949 0 0
J. Tyerman, Walworth	3,879 0 0
Owen, Slough	3,810 0 0
Gibson, Southall	3,661 0 0
W. Wilkin & Son, Oxford	3,573 0 0
J. Willis, Windsor	3,555 0 0
J. Deverill, Slough	3,556 0 0
Bowyer, Slough	3,450 0 0
J. Bottrell, Reading	3,440 0 0
C. F. Kearley, Uxbridge	3,497 0 0
Hann & Co., Windsor	3,423 0 0
F. Claridge, Banbury	3,415 0 0
F. Higgs, London	3,400 0 0
Woodbridge, Maidenhead	3,260 0 0
W. P. Reavell, Windsor	3,140 0 0

For forming roads on the Upper Parkstone Estate, for the Corporation of the Borough of Poole. Mr. John Elford, surveyor :—

Saunders & White, Bournemouth	£269 18 10
S. Palmer, Bournemouth	160 0 0
H. Pond, Corfe Mullen	124 0 0
C. Harwood, Longfleet	75 0 0
W. A. Guy, Parkstone	60 0 0

For the forming, making, draining, and curbing the above roads (complete) :—

C. Harwood, Longfleet	£1,130 0 0
W. A. Guy, Parkstone	1,075 5 0
Saunders & White, Bournemouth	997 16 0
H. Pond, Corfe Mullen (accepted)	795 17 4

[Surveyor's estimate £1,140].

Accepted for extensions at the Royal Seed Establishment, Wordsley, Stourbridge, for Messrs. Edward Webb & Sons. Mr. J. R. Veall, architect, Wolverhampton :—

John Guest, Brettel-lane	£2,500 0 0

Accepted for rebuilding engine-house at the Old Mill, Wordsley, for Messrs. Edward Webb & Sons. Mr. J. R. Veall, architect :—

John Guest, Brettel-lane	£560 0 0

Accepted for alterations and decoration to 30, Chester-terrace, for Mr. Burra. Messrs. Romaine Walker & Tanner, architects and surveyors :—

Clarke & Manooch	£587 13 6

[Three tendered].

For the erection of two pairs of semi-detached cottages at Lee-on-the Solent, near Fareham, Hants, for Mr. J. C. Robinson. Mr. J. E. Clifton, 2, Victoria-terrace, Swanage, Dorset, architect :—

J. Butt, Gosport	£947 0 0
W. Rapley, Forton	890 0 0
J. Plummer, Fareham	885 0 0
C. M. Dash, Gosport	827 0 0
E. Tull, Southsea	795 0 0
J. Gamblin, Fareham	593 9 6
F. G. Fullford, Brockhurst *	550 0 0

* Accepted.

Accepted for finishing certain buildings in Duckfoot-lane, E.C., for Mr. Hammond Thompson. Mr. J. W. Brooker, architect, Railway Approach, London Bridge :—

J. Beale	£980 0 0

[No competition].

For warming and ventilating by their new hydro-caloric system the Queen Mary Quarter of Royal Naval College, Greenwich :—

J. Weeks & Co., Chelsea	£583 0 0

[No competition].

For alterations to 21 and 23, Ashurn-place, for the Siamese Embassy. Mr. D. J. Brown, surveyor, 61, Lincoln's Inn Fields :—

Simpson & Son	£884 0 0
Green	557 0 0
Hearn	539 0 0
Colls & Son	448 0 0

For the erection of new premises, Deansgate, Manchester, for Mr. James Woodall. Messrs. Andrews & Titmas, architects, Arcade-chambers, Manchester :—

Warburton	£13,983 0 0
Parkinson	12,570 0 0
Carlyle	12,503 0 0
T. & W. Meadows	12,335 0 0
McFarlane	12,290 0 0
Wilson, Toft, & Huntley	12,238 0 0
Wm. Holt	11,912 0 0
Neill & Sons	11,745 0 0
Wm. Brown	11,678 0 0
Southern & Sons (accepted)	11,480 0 0

For the erection of a Conference Hall at Stratford, Essex. Mr. F. Boreham, architect. Quantities by Mr. C. W. Brooks :—

L. H. & R. Roberts	£6,419 0 0
G. S. Williams & Son	6,269 0 0
J. W. Hobbs	6,230 0 0
J. Woodward	6,000 0 0
Shurmur	5,994 0 0
Arnaud & Son	5,985 0 0
W. Reason	5,954 0 0
Atherton & Latta	5,885 0 0
Wall Bros.	5,825 0 0
A. Reed	5,775 0 0
E. Conder	5,760 0 0
North Bros.	5,700 0 0
J. Morter	5,690 0 9
J. Holland	5,650 0 0
W. Gregar	5,600 0 0
Hearle & Son	5,585 0 0
Martin, Wells, & Co.	5,400 0 0
J. Holloway (accepted)	5,375 0 0

For the erection of new Church of All Saints', Upper Holloway. Mr. J. E. K. Cutts, architect :—

Geo. Dobson	£5,490 0 0
J. Tyerman	5,074 0 0
J. Dixon	5,022 0 0
Lathey Bros.	4,933 0 0
Holliday & Greenwood	4,926 0 0
Dove Bros.	4,875 0 0
Roberts Bros.	4,838 0 0
With Pitch Pine Roof and Seats.	
Roberts Bros.	5,013 0 0
Dove Bros. (accepted)	4,975 0 0
Holliday & Greenwood	4,926 0 0

[Architect's estimate, £5,000].

For alterations at Wilton-square Welsh Chapel. Mr. F. Boreham, architect :—

Dove Bros.	£2,765 0 0
G. S. Williams & Son	2,655 0 0
J. Grover	2,484 0 0

For the enlargement of Brecknock villa. Mr. F. Boreham, architect :—

Aldis Bros.	£309 0 0
Shurmur	297 0 0
G. S. Williams & Son	263 0 0
Smith	250 0 0

Accepted for the erection of billiard-room, lavatory, &c., for Mr. C. Bone, 130, Tulse-hill, Brixton. Mr. C. Riddick, architect :—

C. Riddick & Sons, Brixton	£300 0 0

[No competition].

For alterations at the White Bear public-house, Kennington Park-road, for Mr. S. Bannell. Mr. H. I. Newton, architect, 13, Queen Anne's-gate :—

Royal	£1,146 0 0
Canning & Mullings	1,017 0 0
Godden	953 0 0
Cook	897 0 0
Walker	844 0 0
Burman & Sons (accepted)	—

Shop Fronts, Central Fish Market.—In the list of tenders for this work in last week's *Builder*, for "Webb & Rolfe" read "Webb & Rosser." In reference to the same list, Mr. T. L. Green writes to say that his tender was withdrawn, owing to an error. Its amount should have been 997*l.* instead of 797*l.*

Special Notice.—Lists of tenders frequently reach us too late for insertion. They should be delivered at our office, 46, Catherine-street, Strand, W.C., not later than four p.m. on Thursdays.

TO CORRESPONDENTS.

F. P. (out of our scope).—H. H. (letter and photo received).—T. W. W. (will appear before long. Shall be quite willing to continue the subject).—J. F. & Sons.—J. B. D.—"Wood-carver" (no space this week).—E. P. B.—J. B. C. (below our mark).—E. H. L. B. (amount should be sent).—H. T. (next week).

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

PUBLISHER'S NOTICES.

The SPECIAL SUMMER NUMBER of "The Builder," to be published next FRIDAY, will contain the following ILLUSTRATIONS :—

DESIGN FOR DECORATION OF DOME OF ST. PAUL'S. By Mr. E. J. POYNTER, R.A. (COLOURED Facsimile.)

CIRCULAR PANELS IN THE ABOVE. Representing "The Resurrection," by SIR F. LEIGHTON, P.R.A. and "Christ in Judgment," by Mr. E. J. POYNTER, R.A. (Larger scale.)

FACSIMILE of ORIGINAL DRAWING by the Late W. BURGES, A.R.A. for the Murray Tomb, in St. Andrew's, Wells Street.

PRAYER DESK. Executed by Mr. HARRY HEMS, from the Design of Mr. J. P. SEDDON.

NEW CHURCH, PORTSEA. By Mr. A. W. BLOMFIELD.

The Literary Matter will be of the usual high-class and interesting character.

Special Advertisements should reach the Office, if possible, by 10 a.m. on WEDNESDAY, 2nd JULY.

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DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, PREPAID. To countries within the Postal Union, 26s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C

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